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EDP industry report

● THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"The Gray Sheet"

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D.C.BELLOMY, ASSOC.ED. APRIL 16, 1986 ● VOL.21, NO.24 P.J.MCGOVERN, PUBLISHER

REORIENTATION: U.S. COMPUTER VENDORS IN JAPAN

Anonymous U.S. officials privy to the recent discussions in Washington between President Reagan and Yasuhiro Nakasone, Japan's prime minister, have reported that Nakasone promised to effect a "historic change" in Japanese trade policy. To achieve both the immediate goal of circumventing protectionist impulses in the U.S. and the country's long-term interests as a mature economy now competing with low-cost manufacturers like Korea, the Japanese government will use its considerable leverage to emphasize imports at the expense of exports.

Many Americans are taking their sushi with a grain of salt. Whenever the two men meet, it seems, the Japanese promulgate a new manifesto (the New York Times counted seven different revolutions in trade practices promised at eight separate encounters) -- but the import/export imbalance only grows worse. For all the vaunted prowess of MITI and other Japanese government agencies, it is always easier to prod people into doing what comes naturally than what goes against the grain. In Japan, reliance on export revenue comes naturally.

Nevertheless, some U.S. high-tech companies selling in Japan are already benefiting from the changing trade environment. Obviously U.S. semiconductor vendors, stuck in a 10% market share groove in Japan, have not as yet profited. Talks among the governments and chip manufacturers of both countries are still at an impasse. But finished products from U.S. computer vendors are faring relatively well in the tightly interlocked Japanese market.

The contrast to Japan's domestic computer vendors is striking. Fujitsu, Hitachi, and NEC are expected to post steep revenue drops when they announce results for the fiscal year that ended on March 31. Although much of the decline is due to their participation in the semiconductor sector, they are also starting to suffer in comparison to the new competitive edge for U.S. vendors:

- The Japanese government is pressuring state agencies and universities to consider American computers, while MITI is requesting large corporations to file concrete "Action Programs" on imports.
- On January 20, 1986, the 3.9% tariff on CPUs and the 4% duty on peripherals went out of existence.
- The stronger yen is starting to favor imports.

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Government-sponsored affirmative action programs (sometimes amounting to quotas, otherwise a despised word in the Reagan administration) help computers more than many other import categories, both because all large organizations use them and because they bear the high price tags that can meet capital expenditure goals for imports with minimal disruption to existing trade patterns. Hence major deals have involved superexpensive U.S. supercomputers. Nissan Motor Company has put itself down for two Crays, even though it has close traditional ties to Hitachi; NTT followed suit with another two Crays.

The abolition of tariff duties on computers and the shifting yen/dollar ratio will probably have even more of an impact during the new fiscal year, since major U.S.-related firms did not begin to cut prices to reflect lower import costs until February. Following the initial moves by Burroughs and Nihon DEC, an average 10% price cut for U.S. systems is expected.

Nevertheless, the impact of the new trade climate in Japan on individual vendors will vary according to other strengths and weaknesses and to product mixes and cycles, as a brief glance at some of the major players will show.

IBM Japan. The decade-long slippage in Japanese market share to Fujitsu, which emerged from its Number Two But Trying Harder status beneath IBM Japan to undisputed revenue leadership, prodded IBM into action early last year. As reported in the Gray Sheet on January 31, 1985 (Vol. 20, No. 19), IBM beefed up the Asia/Pacific Group with an unprecedented proportion of Americans (250 out of 400), and rethought its marketing against the native Japanese giants.

It seems to be working. IBM Japan's 1985 revenue of 914.5 billion yen ($4.6 billion at the December 31, 1985 exchange rate) represented a 19% jump over 1984, at a time when its chief rivals were all slipping in revenue and market share. Of this total, 658.6 billion yen ($3.3 billion) came from a 20.7% increase in domestic Japanese revenue, while the remaining 255.9 billion yen ($1.3 billion) derived from exports, which grew 14.7%. Pretax profits grew 31.9% to 134.8 billion yen ($674 million), while net revenue ballooned 33.7% to 73.0 billion yen ($365 million).

Particular success was achieved by IBM Japan's PC 5550 family (essentially comparable to ATs), S/38, and the 3090-200, 70 of which were shipped to sites in Japan. IBM Japan's Yasu Plant has reportedly been working triple shifts to meet the demand for Sierras, which has largely emanated from the banking and finance sector installing online systems and international data networks in the wake of the deregulation of the Japanese communications industry. IBM's multinational character and U.S. base give it an edge in this explosive market.

Aggressive marketing also helps. IBM Japan no longer bothers to publish a price list or mark down systems to reflect the cuts announced by Armonk. Instead, it apes its competitors by quietly negotiating deals that please Japanese buyers by appearing to offer huge discounts, although in reality the final bid seldom if ever dips below an unofficial "shadow price." Moreover, billing is now often delayed; IBM's accounts receivable increased 48% in 1985.

It's a case of "when in Rome" as far as IBM Japan is concerned. In the view of one company spokesperson, "Japan's domestic manufacturers, such as Fujitsu, Hitachi and NEC, have outrageous prices. They know no limits in discounts when faced with tough competition. To cope with the situation, IBM Japan must also fight in the same arena -- that of a cutthroat price race."

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LARGE-SCALE INSTALLED BASE, IBM JAPAN AND IBM U.S., JANUARY 1, 1986
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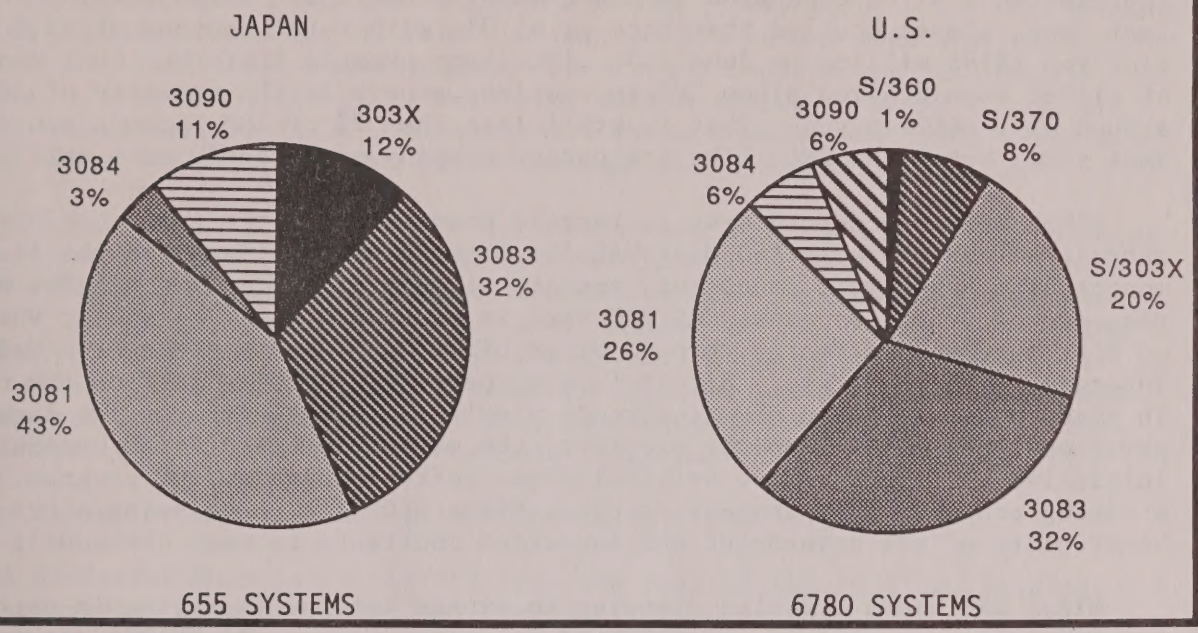

Ironically, though, IBM Japan is to a degree the prisoner of its past success. It can engage in hand-to-hand combat with Japanese computer vendors in the executive suites of Japanese corporations because it has portrayed itself as a Japanese corporation. However, its marketing strategy won't work against U.S. firms that are advertising the new low prices allowed by the exchange rate and tariff abolition. In fact, the surging yen could force IBM Japan to raise prices somewhat. Moreover, Japanese companies will earn no brownie points with MITI by buying IBM Japan products -- they're not imports.

One U.S. company is trying to capitalize on IBM Japan's discomfiture. Comdisco has established a Japanese subsidiary attempting to create a third-party leasing alternative to IBM Japan, which has either leased systems on its own (the source of 10% of its revenue), or sold machines to Japanese leasing companies. In the U.S. that would count as third-party leasing, but in Japan, IBM's retention of maintenance charges makes the IBM-leasing company relationship seem analogous to traditional manufacturer/distributor ties and to the mushrooming U.S./Japanese joint ventures. Hence Comdisco Japan offer its own maintenance contracts for the IBM products leased by six Japanese firms.

Its prospects have brightened with the new emphasis on imports, since Comdisco will buy new and used systems in the U.S. that Japanese corporations will be able to count in their Action Programs. It has started small with two used 3081s brought from the U.S., but reports that it has begun to receive inquiries about 3090s. Its gravest threat to IBM Japan, however, may be if it begins to whet appetites for used computers, which currently account for only around 3% of the installed base of IBM multiuser systems in Japan.

Comdisco Japan is nevertheless not yet a serious threat to IBM Japan, whose parent organization has signaled its intention to pay close attention to events in Japan by dividing its Americas/Far East marketing group in two parts. But Comdisco's emergence is a reminder that in the immediate future IBM Japan will not have as many advantages as some of its U.S.-based competition.

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Nihon DEC. Digital's Japanese subsidiary has rebounded from a cycle of declining annual revenue growth rates, although its low point in FY1984 still represented a 21.4% expansion in the company's coffers. FY1985, which ended last June, almost doubled that pace at 41.9%, with total revenue of 43.8 billion yen ($188 million on June 30). IDC Japan expects that the final months of FY1986 should allow Nihon DEC to continue growth in the vicinity of 40%, to around 61.3 billion yen. That is still less than 7% of IBM Japan's yen intake last year, but Nihon DEC, like its parent company, is clearly on a roll.

Nihon DEC's recent success is largely predicated on the availability of attractive new products (60 MicroVAX IIs were shipped to Japan in the first two months after they were announced) and its library of VAX software. For example, around 20% of Japanese CAD/CAM work is done on Digital machines, whether on VAXs purchased directly through Nihon DEC or on OEMed systems from Calma, Intergraph, and the like. But it is also beginning to benefit from the changes in trade policy. Nihon DEC is already widely represented in the two largest government-sponsored computer projects, the much-ballyhooed Fifth Generation initiative and the far more critical Sigma software development program. With a strong profile in government circles, Nihon DEC is also becoming a prime beneficiary of new government and education contracts to meet Nakasone's goals.

Nihon DEC execs are also planning to expand into new markets, in particular to commercial processing. From 10% of its total revenue in FY1984, it hopes to increase the commercial share to 30% by FY1990. In this endeavor, Japanese versions of All-in-1 will be less critical than cracking megaconglomerates like Mitsubishi. However, Nihon DEC's long-term prospects still depend on how well it exploits its reputation with U.S.-trained engineers who returned home with fond memories of their college's PDP-11s or 780s. DEC's best bets for new markets are therefore in more technical industries, especially telecommunications.

Nippon Data General. The Japanese subsidiary of DG is the flip side of the coin from Nihon DEC. Growth in FY1985 (ending last September) was explosive -- up 80% in revenue to over 25 billion yen, or nearly 60% of Nihon DEC's take. Of this figure, 14.5 billion yen (some $80 million at today's exchange rate) came from domestic Japanese sales, many to its pool of OEMs, while another $60 million derived from a healthy export business to the U.S. and elsewhere.

At first blush, Nippon Data General looks like the kind of company that should do even better under the new dispensation. It is not to be, since DG in Japan seems to have as much bad luck and timing as its American parent. Its export business, much of it DG Ones, will be adversely affected by the changing yen/dollar ratio, let alone flaccid laptop demand. Its domestic sales are heavily weighted towards semiconductor test equipment, hardly a high-volume item these days, while its OEMs have not been competing effectively in their niches. And then there is the wide perception that DG's products pale beside Digital's. Unsurprisingly, Nippon Data General has downgraded its FY86 sales goals to a flat $140 million, but even this may turn out a little optimistic.

Picking the Winners. If there is one common denominator in these disparate scenarios, it is that success in Japan is correlated most closely to success in the U.S. Other vexsome issues will remain, but, as a general rule, winners in America can also do well in the land of the chrysanthemum and the chip.

(This story is based on research by IDC Japan reported in recent issues of EDP Japan Report.)

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HOW MUCH GAS IN THE CONVERTIBLE? IBM ADDS A LAPTOP

Warily tiptoeing around the inevitable April Fool jokes about a new IBM product that had already lost a significant contract before it was even introduced, IBM eschewed its traditional Tuesday announcements and bundled the introduction of its "laptop" portable, the PC Convertible, with a series of other PC announcements on Wednesday, April 2. But what drew press comment was IBM's first new PC line since the AT, and IBM's first low-end move since killing PCjr.

IBM's failure to achieve volume sales with the PCjr is in fact the spectre haunting Armonk as it prepares to market the Convertible. Shucking "Peanut" helps to explain why IBM had hoped to combine product introduction with the award of the IRS laptop contract that went instead to the Zenith Z-171. IBM can live without the $27 million that Zenith will eventually receive (that comes to only .2% of IBM's gross revenue in the last three months alone, and that was a disappointing quarter). What IBM needed from the IRS was instant credibility that the scaled-down PC-Convertible wasn't just another PCjr.

PCjr-like factors tilting against the Convertible will be:

- A different form factor (3.5") from the rest of the PC line, leading to irksome compatibility and convertibility problems.

- Lower ceilings on memory and storage than many PC users prefer.

There is also one important difference from the PCjr that offers a somewhat more secure market niche: the big buyers for laptops will likely be large corporations often already predisposed to IBM who will buy in bulk, rather than individuals purchasing single computers for the home. But relative security doesn't necessarily mean volume sales, since the laptop market, while potentially stronger than the home market of late, is still emergent and amorphous. Earlier laptop entries have so far failed to pry this market open. Even the IBM logo won't guarantee rapid growth for the laptop market if its product can't leverage off IBM's installed base of PC hardware and software.

In the trade-offs inevitable in any laptop, the Convertible comes off reasonably well. On the negative side, its OEMed LCD display, utilizing a vaguely described "bonding process" to increase readability, is not as sharp as the HP Portable Plus display. The Convertible is also heavier, although still a couple of pounds under the Morrow/Zenith design, without seeming very sturdy. Moreover, the Convertible's dimensions are not particularly compact. On the other hand, the keyboard, which offers standard PC spacing and shape, is a clear winner, and the price is fairly competitive for the functionality.

Nevertheless, options are required to allow the Convertible to live up to its name and find a place in office as well as field work. At $1,995 the Convertible now matches the 5.25" two-floppy IBM PC in cost, processor performance, and RAM (although even with the purchase of two memory modules the most RAM available is 512KB), while offering twice the formatted disk storage (though no hard disk options are currently available for the Convertible). But users won't risk their eyesight by using an LCD display all the time, which is why IBM made it removable. However, they'll need a $325 CRT Display Adapter to hook up with the $180 9" monochrome or $400 13" color displays announced for the Convertible. With optional connectors and cables, the adapter can also hitch the Convertible to the PC or PCjr color displays, or to a TV.

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The single greatest drawback to combined office/field use of the Convertible, though, is the 3.5" floppies. The form factor is an issue not because it is unique (most leading laptops use it), but because it diminishes the compatibility with the huge PC installed base. IBM has tried to address the problem, though at a cost to end users (e.g., a 3.5" external disk drive for 5.2" members of the PC family and an internal 3.5" option for new XT models). However, IBM doesn't seem to want to emphasize the storage dividends in 3.5" until it is ready to commit to the smaller size as a standard hardware feature.

Leading PC-compatible packaged software vendors promise that 3.5" versions of popular programs will soon hit the shelves. However, IBM would have to make the form factor standard before anything like the current cornucopia of software is available. Until then, users will have to load 5.25" programs onto 3.5" diskettes, a task that may not be bug-free even when legally feasible.

In sum, the IBM logo and the Convertible's price can generate sales, but probably not enough to stimulate an IBM-led boom in laptop computing -- not until users can view laptop and desktop PCs as aspects of one continuum.

CHARACTERISTICS OF TEN LEADING LAPTOP PORTABLE PERSONAL COMPUTERS, APRIL 1986
(SOURCE: Manufacturers and Distributors)

Product	Base Price	Weight	Dimensions "	Memory	Storage	PC Compat.
Data General DG One	2,195	9 lbs	13.75 X 11.75 X 3	32KB ROM; 256KB RAM 512K options	One 3.5" 720KB floppy	yes
GridCase II	3,150	12 lbs	12 X 15 X 2	ROM options to 512K 128K RAM, to 640K	3.5" 720KB; 10MB Win. opt	yes
H-P Portable Plus (enhanced)	2,695 3,395	10 lbs	13 X 10 X 3	192K ROM; 256K or 512K RAM, to 1.3MB	E-disk; 3.5" 710KB floppy	no
IBM PC Convertible	1,995	12.2 lbs	14.7 X 12.3 X 3	64K ROM; 256K RAM, 256K options	Two 3.5" 720KB floppies	yes
Kaypro 2000	1,995	11.5 lbs	11.5 X 13.1 X 2.6	8K ROM; 768K RAM	One 3.5" 720KB floppy	yes
Morrow Pivot II	1,875	15 lbs	9.5 X 13 X 6	32K ROM; 320K to 640K RAM	Two 5.25" 360K floppies	yes
NEC 8401A Starlit	999	4.7 lbs	12 X 8.5 X 2.25	96K ROM; 64K to 96K RAM	320K Micro-cassette	no
Tandy 600	1,599	9.5 lbs	13 X 10 X 2.5	160K ROM; 32K RAM, to 224K	One 3.5" 360K floppy	no
Toshiba T1100	1,999	9 lbs	12 X 12 X 2.6	8K ROM; 512K RAM	3.5" 720KB	yes
Zenith Z-171	2,399	14.3 lbs	14 X 13 X 6.6	32K ROM; 256K RAM, to 640K	Two 5.25" 360K floppies	yes

PC Realignment. In other moves announced on April 2, IBM finally decided it was time to respond to the clones by resetting the AT's clock from 6MHz to the 8MHz of which it was always capable. Meanwhile XT models introduce half-height floppies and a 20MB hard disk. The new AT/XT models come with a choice between the original PC keyboard and the improved version first seen on the RT.

The price cuts on most existing models that were announced seem mostly to pass along to consumers some of IBM's savings on storage devices. A $300 cut on the dual-floppy PC and a $150 slice from the single-floppy PC are probably too minimal to portend IBM's participation in an all-out 8088 price war.

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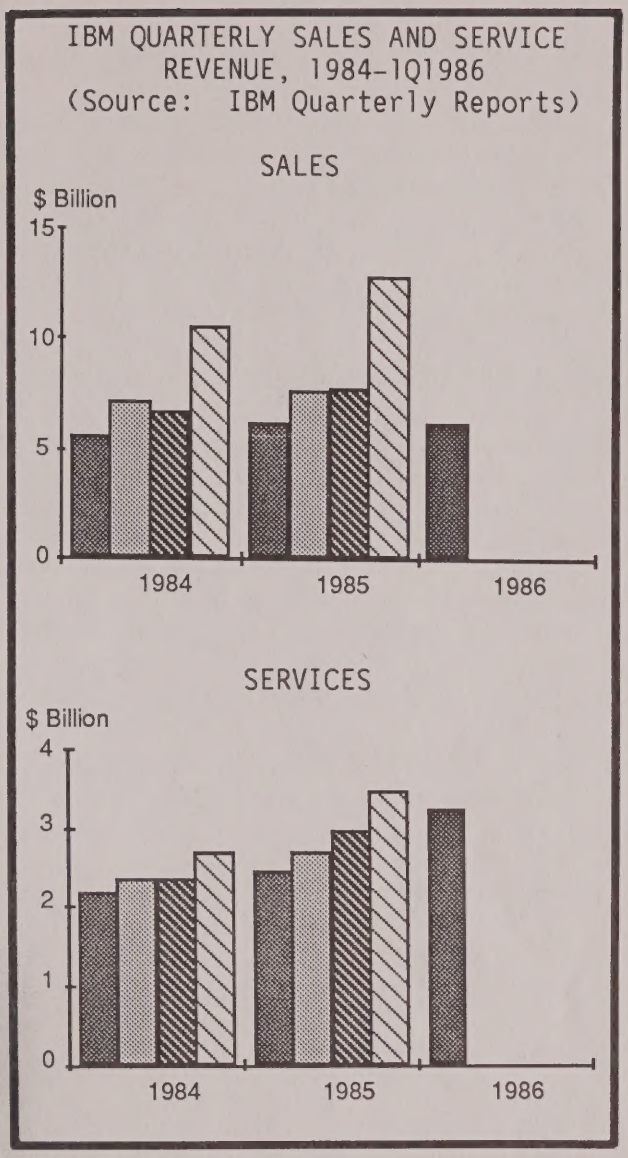
SMALL SALES AT BIG BLUE

It was the far-from-best of times, it was the could-have-been-worse of times. In other words, with all due respect to the Inimitable Boz, things are rarely so extreme as the famous opening sentences of A Tale of Two Cities might seem to suggest.

The financial results for the first quarter of 1986 released by IBM on April 11 were comparatively weak. Revenue was up only 3.7% from the first quarter of 1985, when the Great Softness was starting to take its toll and the Sierra announcement began to leach away 308X sales. Net income grew 3.6%. Particularly troublesome was a slight .3% decline in sales from a year ago, offset by a 31.5% rise in services. John Akers cited as explanations "an uncertain North American economy and slow growth in capital spending," partially ascribable to confusion about tax legislation, and steady growth in foreign sales that nevertheless could not match last year's meteoric rise.



All true, but the most salient comparison may be consecutive quarters. There is normally a drop in sales from fourth quarter to first quarter reflecting user budget cycles, but this year's has been especially precipitous. First quarter sales of processors, peripherals, office systems/workstations, federal systems, and "other" products rang up less than half the revenue (47.6%) than they registered in 4Q1985.

The most cogent explanation of the drop, though Armonk is understandably loath to bring up the subject, is that IBM beat the bushes for every conceivable Sierra sale in the waning weeks of 1985 in its unsuccessful bid to achieve a rise in annual net income over 1984. OnSite Test Allowances were particularly generous in this period; in Japan, where bid criteria are fairly loose (see earlier story), some users reportedly had up to six months to start paying.

Thus IBM was sopping up demand that would otherwise have manifested itself in the next quarter, and the first three months of 1986 need not be considered an adequate gauge of large-scale demand that develops for the rest of the year. There's no guarantee that the other factors cited by Akers won't still depress sales, but at least 1986 can now begin to create its own profile.

First quarter services revenue also dropped from 4Q1985, but only 7%. The dip probably correlates to a drop in software for new systems; software for the installed base, maintenance and other services are dependable cash cows.

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• MISSING THE DIGITAL BUS. The new VAX 8500 offers three 780-equivalents in performance (circa 3 MIPS for those so minded) for the price of a 785 (1.5 780-equivalents), and thus fills a gap in the 8X00 series between the 8300 and 8600, and in the VAXBI family offers a machine between the 8300 and 8800. The 8500 looks like a detuned uniprocessor version of the 8800, even if Digital emphasizes distinctions in packaging that it feels are differences in kind, not just in degree. If it were regarded as the harbinger of a full-service 8800 uniprocessor, Digital might fear that users would start to balk at buying non-VAXBI 8650s at potentially the same performance point.

Indeed, tardy VAXBI development has left Digital with some uncomfortable anomalies. The absence of the new bus on the 8600 and 8650 is less difficult to explain than requiring purchasers of 8200s and 8300s, billed as miracles in packaging, to accept Unibus adapters in processor-size cabinets. The 8500 can be touted as the first "native VAXBI" system -- i.e., minus a required Unibus adapter -- because there is now a VAXBI Ethernet port, without which Ken Olsen would not allow a new VAX system to ship. Digital execs intimated that the Ethernet port will soon go on 8200s and 8300s, and that Unibus adapters will then become options rather than requirements. Meanwhile early 8200/8300 sites will have been stuck with a kludgy compromise that could have been averted.

• TANDEM HIGH SPOT. Bringing VLSI technology to high-end fault-tolerant transaction processing, Tandem has unveiled the NonStop VLX, which it claims offers twice the transaction throughput of a TXP. A new maintenance subsystem called Check will provide fault-tolerant diagnostics and remote support in tandem with the VLX. The four-processor entry system costs $995,275.

• WANG AIMS HIGH AT LOW END. Despite continuing signs of managerial turmoil, Wang displayed aggressive technical and marketing expertise at the introduction of two small-scale VS processors to compete against MicroVAX II and S/36. The 8-user VS-5 for $12,000 replaces the VS 15 at $19,950, while the more powerful VS 6 offers VS 65 performance at a VS 15 price. There is a new, less costly intelligent terminal, the 4230A, as well. But the announcement's high point was the unusual public benchmarking of a fully configured VS 6 against similar MicroVAX II and S/36 systems. Guess who won handily?

• COMDISCO WINS TAX POINT. The quarrel with the IRS over tax liability for lump-sum revenue on leases has been resolved in Comdisco's favor.

• AND SOFTWARE TOO. Additional April 2 announcements from IBM -- notably expanded memory for 3270 PCs, permitting up to six concurrent DOS sessions of different sizes of RAM; new 3270 communication software offering varying levels of utility according to user need; and Topview 1.1, allowing application houses to use the program more effectively -- underscore IBM's statement that it is now putting more money into development for PC software than for new hardware.

• MORE TOKEN STEPS. Crucial pieces of the token ring have been announced -- a S/36 connection through a dedicated AT, access to 370 architecture, a network manager, long-distance fiber optic connections, etc. Meanwhile Ford and IBM have completed a prototype PC Net broadband network supporting MAP.

• REVIEW AND FORECAST. Don't be surprised when your next Gray Sheet, the first issue of its twenty-second year of publication, looks a little different.

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REVIEW & FORECAST
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D.C.BELLOMY, ASSOC.ED. MAR. 28, 1986 ● VOL.21, NO.22-23 P.J.MCGOVERN,PUBLISHER

Annual Migration Survey Results Inside

AFTER THE MAINFRAME "TRANSITION," LARGE-SCALE CHANGE WILL CONTINUE

Plus ça change. . . ? The hurly-burly in large-scale systems anticipated for 1985 occurred, but in retrospect, it could have been far worse. By year's end, IBM had weathered the Sierra earthquake with its market share intact, while the industry as a whole registered a modest gain in large-scale system revenue.

Nevertheless, something crucial changed in this product transition, for it also signaled the beginning of a half-decade of lower mainframe growth rates. If IBM has escaped the vertiginous drop in mainframe orders and temporary loss in market share to the Bunch that it suffered in 1981 after the 308X announcement, neither will it enjoy the strong rebound it registered in 1982 and 1983. One major difference from the last transition is that IBM shipped 530 of its new 3090 generation in 1985, 16% of the total of all large-scale shipments.

The bottom line nets out to slower segment growth. During the two years of transition and rebound running from January 1985 through December 1986, revenue from the large-scale market will probably have grown around 16.6% over 1984's pre-Sierra gross, as against the 41.4% gain registered in 1981-82 over 1980's pre-308X revenue. And the trend will continue, with decent but relatively modest growth rates over the next few years. Compared to the first half of the '80s, the second half will look more like Alan Alda than Sylvester Stallone.

- In 1985, worldwide large-scale unit shipments slipped 13.6%, while large-scale revenue managed a Sierra-fed gain of 5.4%.
- This time the transition did not depress IBM market share. IBM's share of 1985 mainframe shipment value rose to 75.9%, as the total IBM base (including PCMs) rose to 82.1% of the total.
- Most U.S.-based large-scale vendors had to lean on the international market to an unprecedented degree. The ratio of international to U.S. shipments was closer to even-up than ever before.
- In 1986, worldwide unit shipments should grow around 19.4% over 1985, and shipment value in the vicinity of 10.7%.
- After burgeoning an average of 16.6% p.a. from 1980 to 1985, large-scale shipment value will grow around 6.5% annually 1986-1990.

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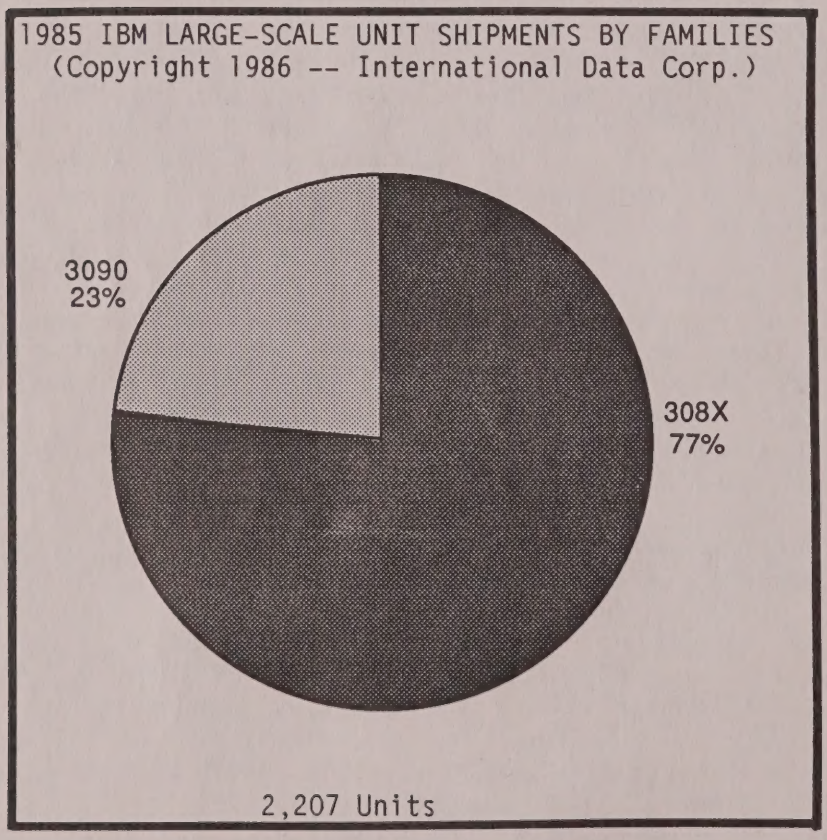
IBM's Sierras: Still Not the Delectable Mountains

IBM has not received enough credit for fine-tuning a mainframe transition. In 1985 it had to balance at least three distinct, often incompatible factors: first, user interest in the performance promise of the 3090s; second, financial incentives to clear as much 308X inventory as possible at as profitable a price as the market could be made to bear; and third, corporate pressure to redress the Great Softness in the midmarkets and slowing PC sales with large-scale revenue and net income. By adjusting 3090 delivery dates, IBM achieved what was arguably its best available equilibrium for 1985:

- A little over a quarter of IBM large-scale shipments were 3090-200s, although they comprised fully 40% of the shipment total in the U.S., where the Sierra announcement more severely affected 308X sales.

- Nevertheless, despite user trepidation about starting out in a technological dead end, over 1,000 3083s were shipped. At the high end, there were as many new 3084s as in 1984.



Several qualifications must be added. IDC's shipment figures indicate new systems of any provenance, and much of the 3084 activity has been in upgrades (ergo, less money to Armonk). Also, 1985's busy second-hand market diverted mainframe revenue from IBM. This was a price paid for the perception that Sierra was not so radical a break from 308X architecture as 308Xs were from 303Xs. Moreover, without that perception it is unlikely that IBM could have sold so many 308Xs. But the nub of the matter is that IBM did not repeat its dismal performance during the wait for 308Xs in 1981. It couldn't afford to, since it now lacks a large, comfy cushion of steady leasing income.

Nevertheless, IBM was not in a strong position to reap the fruits of its planning. As economists have learned to their chagrin, fine-tuning can handle small, straightforward problems, but falters as dislocations grow in size and complexity. Mainframes aren't facing crises comparable to a Vietnam or oil embargo, but their problems are probably becoming too intricate for fine-tuning. The Great Softness forced IBM to borrow Sierra sales from 1986 to firm up 1985 bottom lines, just when the maturity of the mainframe market and user uncertainty about the future were depressing long-term large-scale growth rates.

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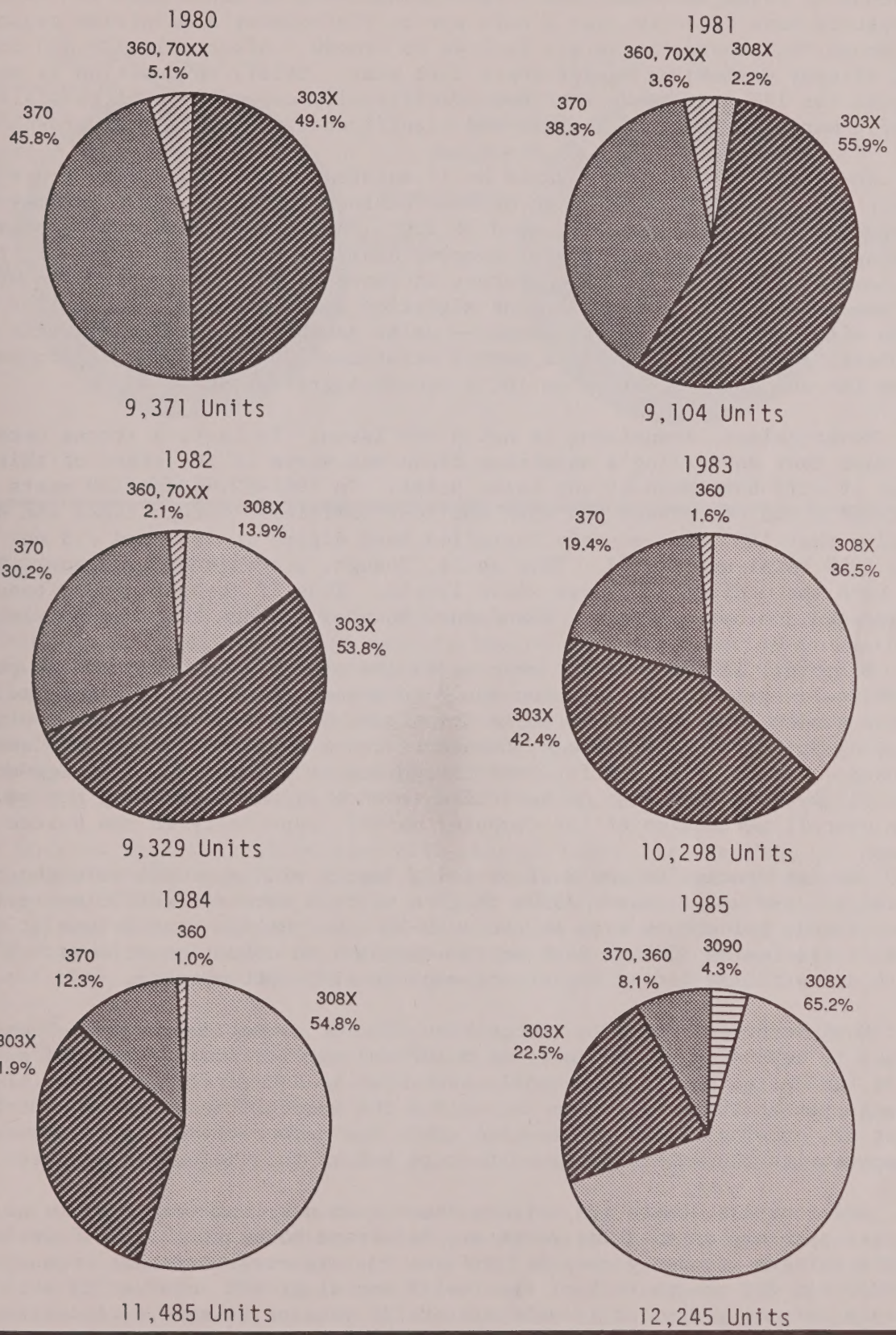
IBM WORLDWIDE LARGE-SCALE INSTALLED BASE BY SYSTEM FAMILY, 1980-1985
(Copyright 1986 -- International Data Corporation)



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Although IDC projections have been warning of this trend, IBM itself seems to have been caught off guard by the continuing failure of large-scale system revenue to stoke its financial fires. Responding to hints from IBM executives, investors have recently cast a cold eye on the company's mainframe prospects, although the problem is hardly limited to Armonk. After all, IBM did improve its already commanding market share last year. Still, no question is more urgent for IBM, a company that has traditionally depended on large-scale profit margins, than the sources and significance of the falling growth rates.

The worst-case scenario would be if mainframes were indeed to prove dinosaurs sinking into the oblivion of mass extinction. As readers who may have encountered the irrepressible head of IDC's Office of Technology Assessment during the recent spring tour of company analysts will vividly recall, this explanation is not without supporters in these halls. The phenomenon Will Zachmann calls "downsizing" -- the migration of applications to smaller systems with better price/performance -- gains added plausibility with the first indication that some users are moving mainframe applications to microcomputers (see the accompanying story on IDC's annual migration survey).

Nevertheless, downsizing is not a new issue. In fact, a strong case could be made that downsizing's mainframe drain was worse at the start of this decade than it will have been at any later point. In 1981-82, large IBM users were offered a choice between the 43XX and 308X families. Enough chose the smaller option that IBM's large-scale installed base dipped in 1981 and did not surpass the 1980 total until 1983. This shift, though, preceded strong growth by IBM at both the medium- and large-scale levels. Thus if downsizing has been a megatrend, so has upsizing. The future balance between them remains in doubt.

Moreover, if the question were as simple as users opting for high performance at low prices, the solution would be straightforward, if hardly pain free for a vendor like IBM. But, while downsizing helps to explain the continuing upswing in small-scale systems, future Review & Forecast issues will show growth rates leveling off for most categories of computers. The biggest problem for vendors dependent on mainframe revenue is not downsizing *per se*, but the overall maturation of the computer market, especially in the United States.

IBM has reacted to the most pressing issues with appropriately short-term answers: two uniprocessor 3090s to give users a more accessible entry into Sierraland, price cuts even on the 3090-400 over half a year before it ships, and fire sales on 308Xs. Each action may have an effect on stimulating demand, although with the latter two at the expense of profit margins.

More important is IBM's recognition that it cannot continue business-as-usual by depending on conventional mainframe applications. The 3090's vector unit, an option on all four models announced to date, represents the clearest signal yet of IBM's intention to reclaim the scientific/engineering market, meet the growing need of commercial users for number-crunching firepower, and compete with the multiprocessor startups before they become entrenched.

Nevertheless, there are neither short-term nor long-term answers to the larger problems of maturing markets. Mainframe money will still flow into IBM's coffers (probably over $77 billion in large-scale systems from 1986 to 1990), but not enough to fuel the 14-15% annual growth required to attain corporate revenue goals, or to maintain profit margins at the level desired by investors. Big Blue will have to learn to fatten itself on other fare.

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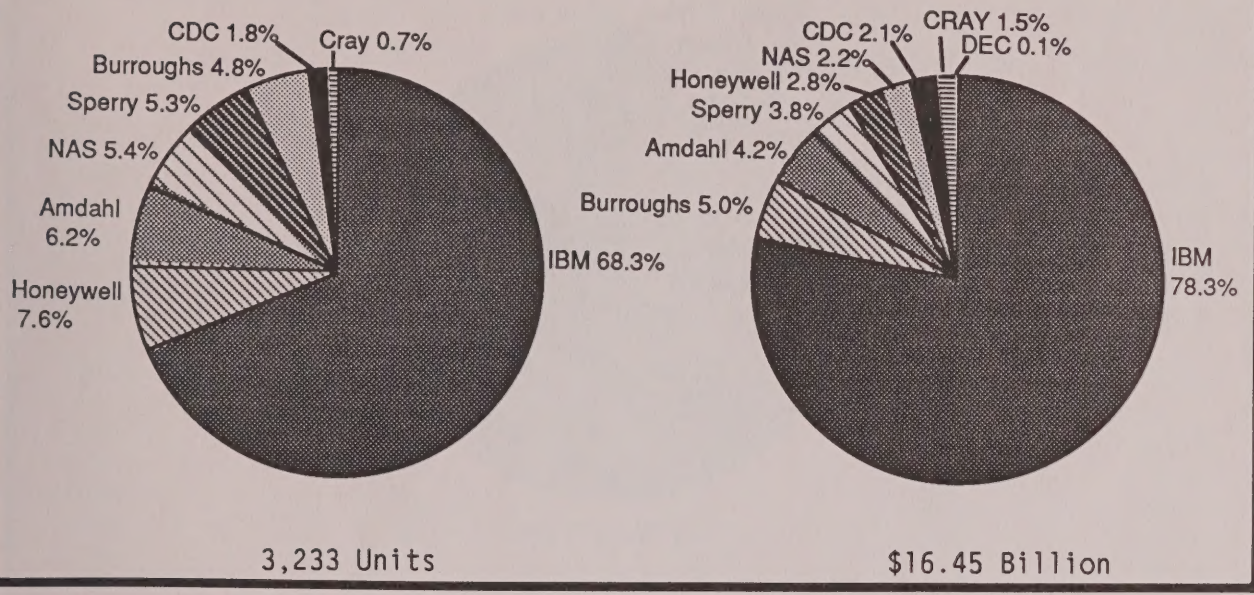
1985 WORLDWIDE MARKET SHARES OF LARGE-SCALE SHIPMENTS BY U.S.-BASED VENDORS, MINUS THIRD-PARTY PERIPHERALS; UNITS (LEFT) AND DOLLARS (RIGHT)
(Copyright 1986 -- International Data Corporation)



PCMs Maintain the Pace

Both Amdahl and NAS successfully treaded water in 1985. Maintaining overall market share, albeit in a flat market, should probably count as a significant achievement during the year that IBM shipped the first model of its new generation. The PCMs probably benefited from user indecision about how different Sierra systems are from 308Xs for the average mainframe environment, since the 3090-200 did not improve over the commercial performance of existing high-end machines from all three IBM-compatible vendors. Moreover, the international market provided a refuge from weak U.S. sales, especially for NAS.

The current year and 1987 may provide sterner tests for the PCMs, as they begin to compete with a fuller Sierra line. NAS's Hitachi connection will be supplying competition to both the 200 and 400 this spring, with the more potent AS/XL 80 giving NAS a temporary leg up on both IBM and its PCM big brother. Amdahl's Fujitsu-based rival to the 3090-400 isn't currently scheduled to ship until late 1987, a year after IBM and a year and a half after NAS.

Amdahl's long-run future is equally risky, although the possible pay off is worth the gamble. On the one hand, it has been cooperating with AT&T to create mainframe Unix systems, which may not have much commercial sex appeal but do give it leverage with Ma Bell and BOC shops, and maybe eventually on some government contracts. On the other hand (the one with the M&Ms), there is a chance to assume a larger role in the international IBM-compatible market.

The potential depends on how Fujitsu reacts to the redefinition of its relationship with Siemens. Fujitsu has been OEMing 308X-class systems to Siemens for sale in Germany, some with the OSIV operating system that Fujitsu cloned from IBM's MVS. IDC Japan estimates that of the roughly 270 Fujitsu systems shipped to Siemens, around 100 operate on OSIV, including most of the recent exports. These are proving hostages to Fujitsu's legal fortunes.

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WORLDWIDE MARKET SHARES OF U.S.-BASED VENDORS' INSTALLED BASE (UNITS)
OF LARGE-SCALE SYSTEMS, 1/1/86
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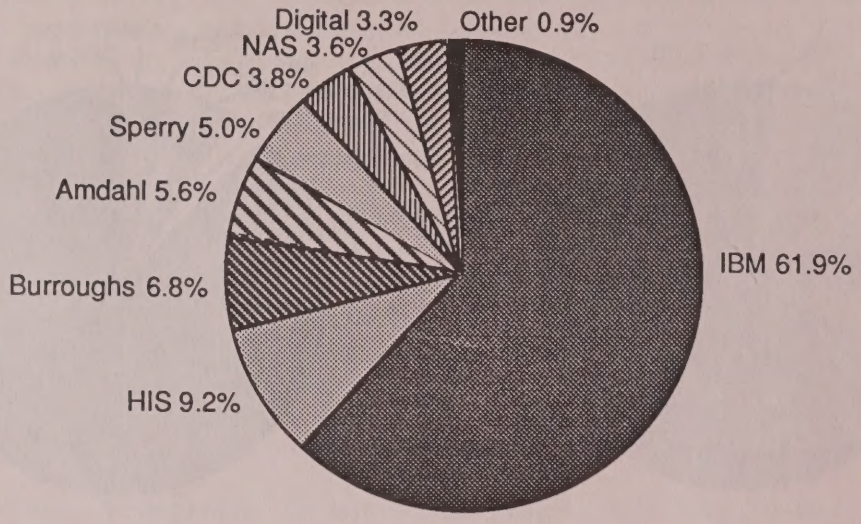

19,800 Systems

VALUE OF WORLDWIDE SHIPMENTS OF LARGE-SCALE COMPUTERS
(Copyright 1986 -- International Data Corporation)

	1985		1984		1983		1982	
	$M	%	$M	%	$M	%	$M	%
IBM Base	13,930	82.1	12,750	79.5	11,640	80.3	8,470	76.0
IBM	12,880	75.9	11,750	73.2	10,760	74.2	7,900	70.9
Amdahl	690	4.1	660	4.1	590	4.1	350	3.1
NAS	360	2.1	340	2.1	290	2.0	220	2.0
Non-IBM Base	2,520	14.8	2,575	16.0	2,150	14.8	1,820	16.3
Burroughs	820	4.8	900	5.6	530	3.7	400	3.6
CDC	350	2.1	480	3.0	470	3.2	390	3.5
Cray	240	1.4	165	1.0	130	0.9	120	1.1
Digital	20	0.1	90	0.6	170	1.2	280	2.5
Honeywell	460	2.7	430	2.7	430	3.0	200	1.8
Sperry	630	3.7	510	3.2	420	2.9	430	3.9
Third-Party Peripherals	520	3.1	720	4.5	710	4.9	850	7.6
TOTAL	16,970	100.0	16,045	100.0	14,500	100.0	11,140	100.0

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LARGE-SCALE COMPUTER MARKET -- U.S.-BASED MANUFACTURERS
(Copyright 1986 -- International Data Corporation)

	Number of Systems Shipped	Cumulative Number in Use	$ Million Value Shipped	$ Billion Value in Use
		WORLDWIDE		
1980	2,380	14,170	7,880	60.3
1981	1,510	14,430	6,150	61.8
1982	2,300	15,170	11,140	68.3
1983	3,390	16,760	14,460	78.8
1984	3,750	18,490	16,100	89.1
1985	3,240	19,800	16,970	97.2
1986	3,870	21,200	18,780	107.1
1987	4,190	22,950	19,980	116.4
1988	4,060	24,550	20,900	127.8
1989	4,360	26,000	22,600	139.5
1990	4,730	27,800	24,200	151.3
		UNITED STATES		
1980	1,320	7,880	4,800	34.2
1981	890	8,290	3,890	36.3
1982	1,480	8,790	6,810	41.1
1983	1,850	9,490	8,150	46.3
1984	2,240	10,570	8,990	52.3
1985	1,650	11,300	9,290	57.1
1986	2,180	12,400	10,400	62.3
1987	2,390	13,500	10,800	67.1
1988	2,150	14,600	11,000	73.3
1989	2,300	15,700	11,900	79.6
1990	2,500	16,900	12,600	85.2
		INTERNATIONAL		
1980	1,060	6,290	3,080	26.1
1981	620	6,140	2,260	25.5
1982	820	6,380	4,330	27.2
1983	1,540	7,270	6,310	32.5
1984	1,510	7,920	7,110	36.8
1985	1,590	8,500	7,680	40.1
1986	1,690	9,300	8,380	44.8
1987	1,800	10,200	9,180	49.3
1988	1,910	11,100	9,900	54.5
1989	2,060	12,100	10,700	59.9
1990	2,230	13,100	11,600	66.1

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IBM's litigation charging Fujitsu with violating the copyright on its operating system has now crossed two oceans. IBM auditors have allegedly been paying surprise visits to users of Siemens's OEMed Fujitsu systems requesting data on the type of software installed, the frequency of use, and other questions usually associated with setting license fees. Siemens naturally did not cotton to receiving complaints from its customers about what they viewed as harassment, but had no legal or commercial reason to involve itself in the dispute.

Siemens sent some of its top execs to Tokyo last fall to assess the situation. When asked the status of the operating system imbroglio, though, Fujitsu could only reply that it was before the American Arbitration Association (AAA), and could promise nothing regarding the timing or nature of the final decision. Siemens was therefore faced with the prospect of indefinite uncertainty about its arrangements with Fujitsu, and of periodic reappearances by IBM auditors.

Before leaving Japan, the Siemens delegation visited the Hitachi plant where its IBM-compatible mainframes are manufactured, allegedly to sound out Fujitsu's rival about serving as either a substitute or, more likely, an alternative source of large-scale systems. The decision as of this month, however, is to stick with Fujitsu hardware, but to discontinue imports of OSIV software. Fujitsu is one of a handful of vendors with the resources to engage in long-term trench warfare with IBM, but it proved vulnerable to a flanking maneuver.

Fujitsu engineers are reportedly hard at work on a fallback position -- a non-IBMlike operating system that, if the schedule holds, should be announced circa 1990. However, because Fujitsu would prefer to retain an OSIV option for its installed base, and because the effort to rewrite application software offerings for the new operating system will be long and tedious, it will be some time before IBM isn't scrutinizing every software move Fujitsu makes.

The new operating system project is an index of Fujitsu's awareness that it is in a comparatively weak position that may eventually have to be abandoned; the Siemens action may prod it to moving sooner rather than later. Already IBM auditors are visiting Fujitsu customers in Australia, although Fujitsu discounts rumors that it might cease exporting its system software to Australia and Korea. A more likely short-term scenario if Fujitsu gets the jitters from IBM's pressure tactics would be for the Japanese giant to concentrate marketing of OSIV in parts of the Pacific Rim, where (compatibility issues aside) its tuning to support the Japanese language is a major plus.

If so, through most of the world Fujitsu and Amdahl would be vying against each other with similar hardware running just IBM software. If so, Fujitsu might find it simpler to transfer the sale of its large-scale system hardware outside Asia to Amdahl. If so, the price of more international sales for Amdahl could be its financial independence, since Fujitsu could decide that divvying up markets warranted increasing its share of Amdahl to outright majority control. Probably few at Amdahl would like such a solution, but neither would they relish the prospect of always bidding against Fujitsu.

Nevertheless, there are a lot of ifs here. Least doubtful are the propositions that the PCM relationship with Japanese manufacturers is inherently unstable, and that the key decisions will be made in Tokyo, not California.

(This story is based in part on an investigation by EDP Japan Report and its parent organization, IDC Japan.)

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VALUE OF BUNCH WORLDWIDE LARGE-SCALE SHIPMENTS, 1981-1985
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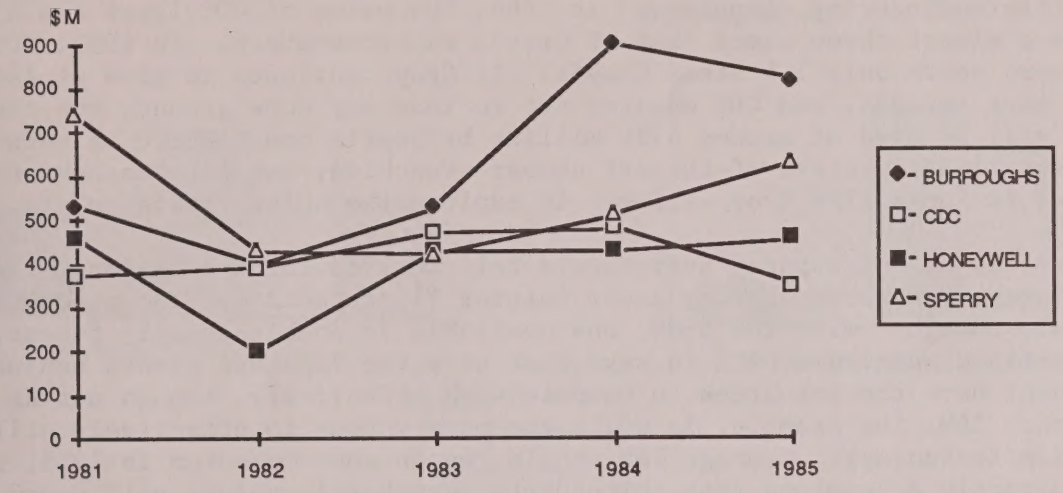

Bunch in Squeeze Play

In 1981, with little action on old IBM systems after the 308X generation was announced, and none on new systems since they weren't shipping yet, the Bunch's share of large-scale shipment value shot up to over a third of the total. In 1985, another IBM transition year, Bunch vendors got only a little over 13% of shipment value, down from 14.5% the year before. The $2.26 billion they reaped in large-scale system revenue last year meant a gain of only 7.6% over 1981, a period when total large-scale shipment value nearly tripled (176%).

The 308X generation transfigured the large-scale market because it also coincided with IBM's move from leasing. Big Blue could afford to see its share of new mainframe shipment value dip in 1980 to just over 50% because it still had a steady revenue stream. As it became dependent on new shipment sales, IBM shot up to over 70% of the market in 1982, while the IBM base (including PCMs) grew proportionately. With that tight a grip on the current user base, IBM could ride out a transition without losing market share to the Bunch.

Largely restricted to supplying their own bases, with the addition of whatever new business they can muster within their niches, most of the Bunch vendors still active in large-scale systems shift relative market position depending on product cycles. In 1985 Sperry almost regained the large-scale shipment value share it held in 1982 due to shipments of the new models 90, 91, and 92 in the 1100 series. Unit mainframe shipments for Honeywell were down sharply in 1985 from 1984, but shipment value grew with the overall market as DPS 8/70 shipments were replaced with newer systems in the DPS 88 and 90 lines.

Two Bunch vendors slipped in 1985, but only one need brood. The value of Burroughs large-scale shipments fell from 1984, but it was still the number two U.S.-based vendor in the large-scale field. If Burroughs doesn't improve its mainframe profile in 1986 as its new Sierra-class A line starts to ship in volume, then it can take out the worry beads. The other large-scale Bunch member, though, is Control Data, whose 1985 shipment value lurched downward from an essentially flat 1984, with nothing new to beef up 1986.

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Other Winners and Losers

It is probably less an index of CDC's troubles than a testimonial to Cray's success to contrast the two vendors that have specialized in high-performance scientific/engineering computers. In 1984, the value of CDC large-scale shipments was almost three times that of Cray's supercomputers. In 1985, CDC shipments were worth only 1.5 times Cray's. If Cray continues to grow at last year's pace in 1986, and CDC manages not to lose any more ground, the two companies will be tied at around $350 million by year's end. There is undoubtedly an upward limit on state-of-the-art number-crunching, but for the next couple of years it looks like Cray will get to explore the outer limits on its own.

The value of third-party peripherals fell in 1985 for two reasons. One is that Storage Tek was operating under Chapter 11 protection. The other is more critical, though: with the 3380, now available in double-density format, IBM has redefined mainframe DASD in ways that only the Japanese giants behind NAS and Amdahl have the resources to compete with effectively, though not as yet to match. IBM, for example, is still the only vendor to effectively utilize thin-film technology. Storage Tek should regain some momentum in 1986, but IBM has apparently determined that third-party peripheral vendors will never again be the market force among large-scale systems that they were in the early '80s. And unless it finds a new way to stumble, IBM can make its decision stick.

AVAILABILITY OF CENSUS DATA

Longtime Gray Sheet readers will note the absence of the census of computers installed by vendor and model group in this year's Review and Forecast issues. This step has been necessitated by the rising cost to IDC of compiling and crosschecking data for the most complete and best-trusted computer census in the industry. The alternative would have been to raise subscription rates far above the level of other newsletters available through IDC.

The January 1, 1986 census is completed, though, and will be available to readers in two other formats:

- o Clients of any of IDC's Continuous Service Programs can request complete census lists as part of their service. Computer Market Planning Service clients are now receiving their census copies in the Preliminary Processor Data Book.

- o The annual Review and Forecast Special Report, which draws on the Review and Forecast issues of the Gray Sheet and other material, will continue to publish the census in the customary format (complete census of large- and medium-scale systems, top ten for small-scale systems and PCs).

Because of our effort to expedite the publication of this year's R&F issues of the Gray Sheet, the 1986 Special Report (Computer Industry Review and Forecast 1981-1990) will be available early in the third quarter. For questions on pricing and orders, contact Diane Szretter at 617-872-8200, ext. 260.

We trust that this new arrangement will not seriously inconvenience our readers. If you have any questions or comments, please don't hesitate to contact us.

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MAINFRAME USER EXPECTATIONS OF ANNUAL RATE OF GROWTH OF ONSITE INSTALLED CAPACITY, 1986-1988
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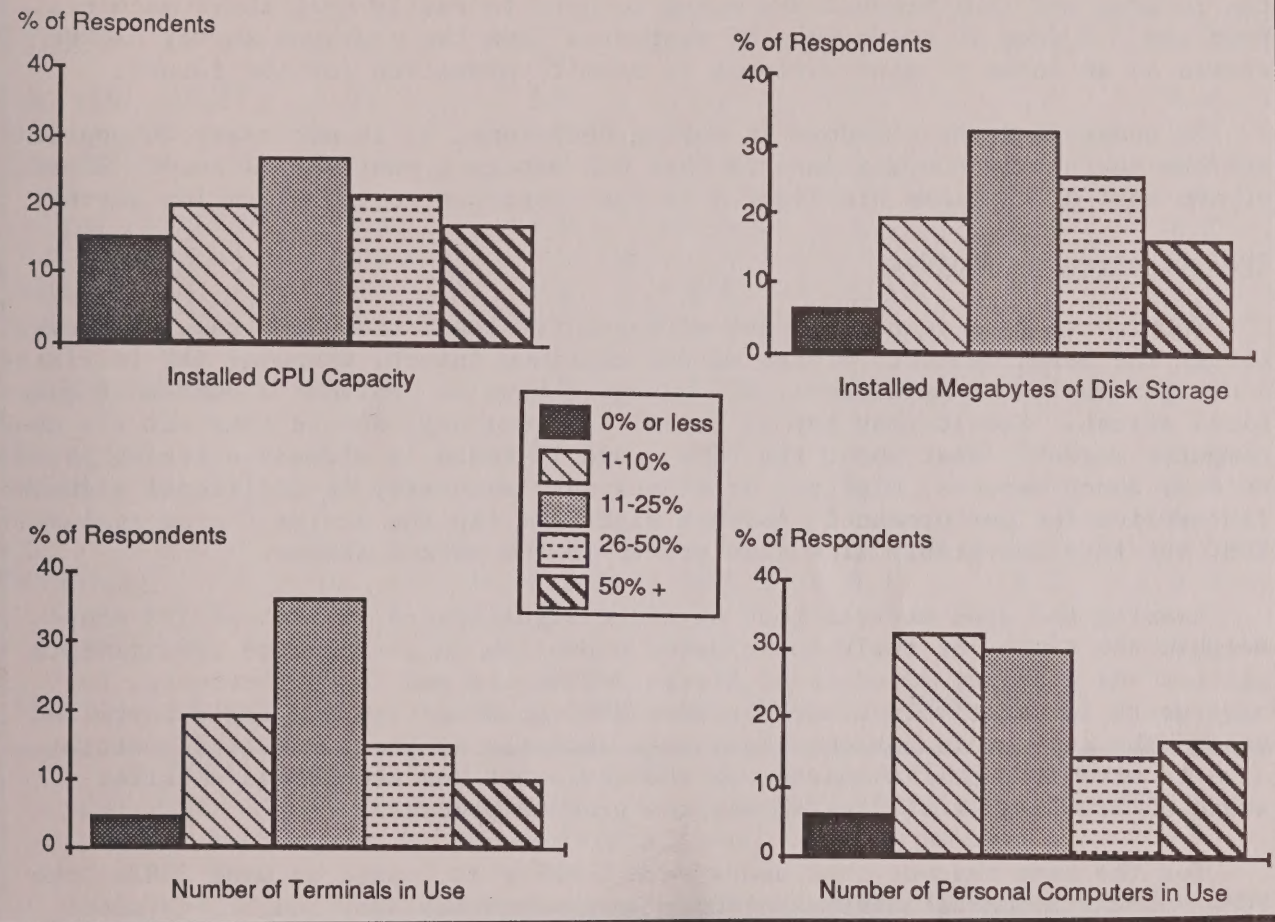

WHAT DO USERS WANT?

Last year's silent user rebellion is not yet over. That is the principal message from the 1986 migration study, IDC's annual report on MIS trends and intentions. As of last December, the sample expected 1986 U.S. demand for 3090-200s to be only about 40% above the 1985 level, even though no Sierras were sold until the last third of the year. Nor do IBM's mainframe rivals fare any better. For vendor after vendor, respondents indicated that 1986 demand would be flat compared to 1985, or even a little down.

The remainder of 1986 in all likelihood won't be that bad. Extrapolating from survey returns, new product announcements, and IBM's recent price cuts, IDC analysts now forecast that in the crucial U.S. market during 1986:

- Around 600 3090-200s will ship.
- Demand will develop for some 950 Sierra uniprocessors (150/180s) and 308X systems.
- When the 3090-400 finally is available in volume, nearly 100 will be needed to absorb the pent-up demand.

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With a couple of exceptions (not to pick on Control Data), other large-scale system vendors can also expect more roseate returns than survey respondents foretold. What the survey indicates is that users are still unsure about the future, and that vendors are going to have to really sell their machines. Even the 25% drop in the number of responses from the previous survey can be viewed as an index of user wariness to commit themselves for the future.

To understand the slowdown in buying decisions, it is necessary to appreciate the tortuously complex factors that MIS managers must now balance. Some of the most crucial are highlighted in the responses to the migration survey.

Proliferation of Choices

Nonblue vendors ye always have with you (at least they hope so). But even though the basic contours of the market continue intact, whenever IBM initiates a new generation of mainframes, MIS managers have to confront a number of questions afresh. Should they buy or lease? If they buy, should they hit the used computer market? What about the PCMs? And if there is already a strong presence by Bunch vendors, Digital, or others, how necessary is additional high-end IBM application performance? Answers might not tip the scales for or against IBM, but they inevitably slow down growth in the market sector.

Leasing and used markets took on added significance in 1985 as IBM shops weighed the timing of their anticipated expansion in performance requirements against the changing schedule of Sierra deliveries and the differences, to many users comparatively minor, between 3090 architecture and their installed base. The survey did not spotlight used activity by year, but it is instructive to note that over a quarter of the equipment was secondhand at sites where an IBM large-scale system was the premier processor.

For the same reasons that users were looking at leased or used 308Xs, the PCMs maintained market share in 1985. When asked why they bought equipment from IBM-compatible vendors, respondents to the survey overwhelmingly (and predictably) cited saving money as the primary reason. The "cost" horse pays PCM vendors 3-to-1 compared to the runner-up (59% citing it as chief consideration over 20% for improved performance). Only 4% are ideological buyers -- that is, they are supporting PCMs primarily to avoid reliance on a single vendor.

The survey had good news and bad news for Bunch vendors. The good news is that respondents with both Bunch and IBM mainframes on site (8% of all Bunch users in the sample) really like what their other-than-blue systems are doing for them. Especially appreciated are the operating system software, price/performance, and online performance; lowest marks were given to the availability of application software from third-party vendors.

The bad news begins with the fact that users don't buy as much Bunch equipment, or as often, as they purchase IBM products (new or used). CPUs are kept on average 50% longer than IBM hardware, which goes a long way towards explaining the relative revenue and income performances of large-scale vendors.

Potentially bad news is that over 60% of Bunch users have considered converting to all-IBM applications; however, inertia (and the high cost of conversion) will keep almost all of them in the Bunch fold. Among the Bunch users who have thought about completely converting to the Big Blue religion, only 8.5% plan to phase out their non-IBM equipment over the next year and a half.

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SOURCE AND RETENTION RATES OF LARGE-SCALE SYSTEM VENDORS' EQUIPMENT
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Vendor	% Used Equip.	Average Number of Years Users Keep CPU	Terminal	Dsk Drves	Printers	Tape Drves
IBM VERY LARGE*	12.9	3.5	5.4	5.2	6.2	6.6
IBM LARGE*	28.2	4.3	6.7	5.7	6.4	7.0
IBM MEDIUM	22.4	4.7	5.9	5.5	6.0	6.6
IBM AVG	21.1	4.1	6.0	5.4	6.2	6.7
AMDAHL	16.7	4.5	5.6	5.0	5.7	6.6
NAS	11.7	3.6	6.1	5.8	7.3	10.8
PCM AVG	14.2	4.0	5.9	5.4	6.5	8.7
BURROUGHS	6.1	6.2	5.7	5.7	4.9	6.4
SPERRY	.4	5.6	4.7	4.9	5.6	6.0
NCR	3.0	7.1	8.4	5.9	8.6	6.8
CDC	5.0	5.5	5.5	6.0	6.5	7.0
HONEYWELL	2.1	6.3	6.8	8.1	8.0	8.3
BUNCH AVG	3.3	6.1	6.2	6.1	6.7	6.9

*IBM Very Large systems include the 3090-200, 3084, and 3081; 3083s are Large.

RELATIVE USER SATISFACTION ON BUNCH SYSTEM CHARACTERISTICS AT SITES WITH BUNCH AND IBM/PCM MAINFRAMES (4 = HIGHLY FAVORABLE, 0 = UNFAVORABLE)
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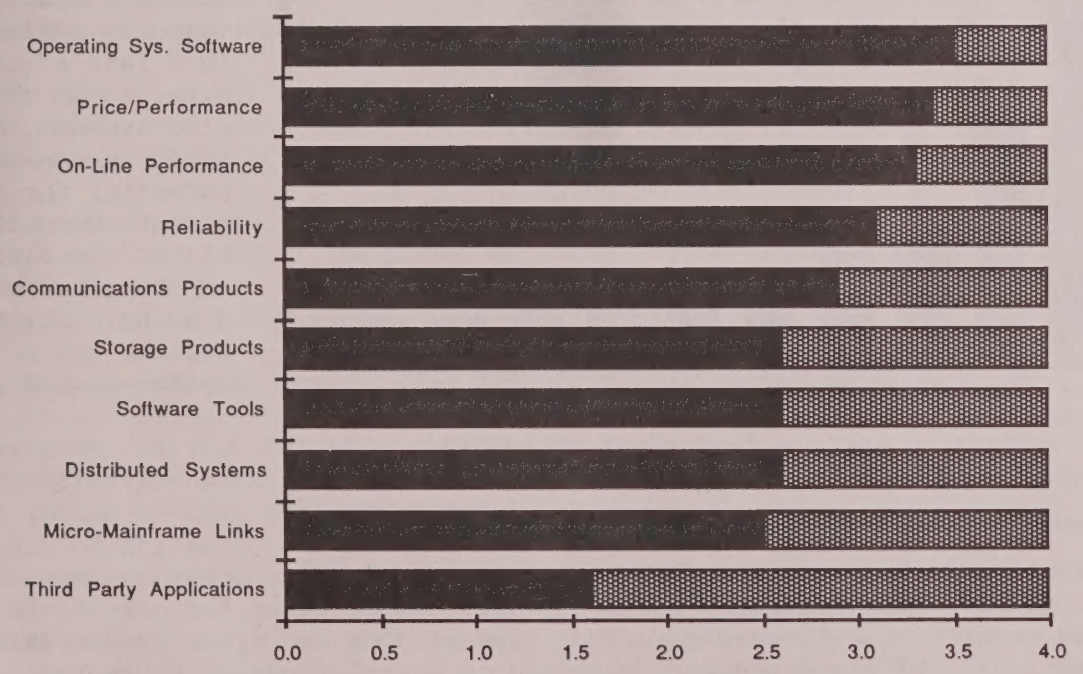

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DISTRIBUTED MULTIUSER SYSTEMS IN USE AT SITES
RESPONDING TO 1985-86 MIGRATION STUDY
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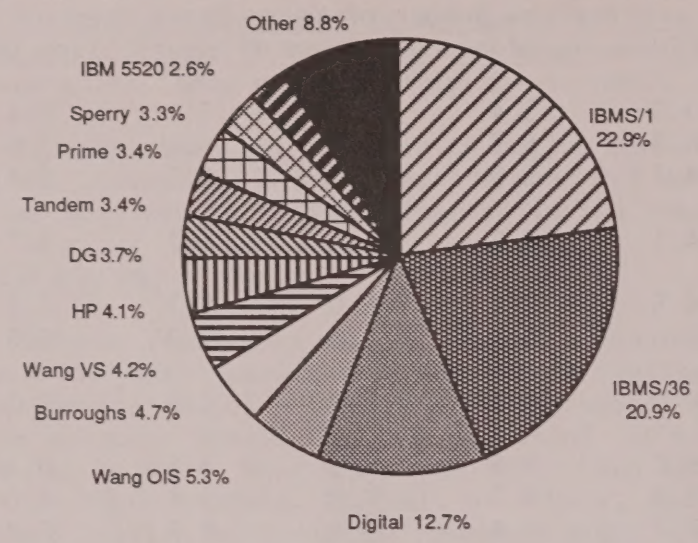
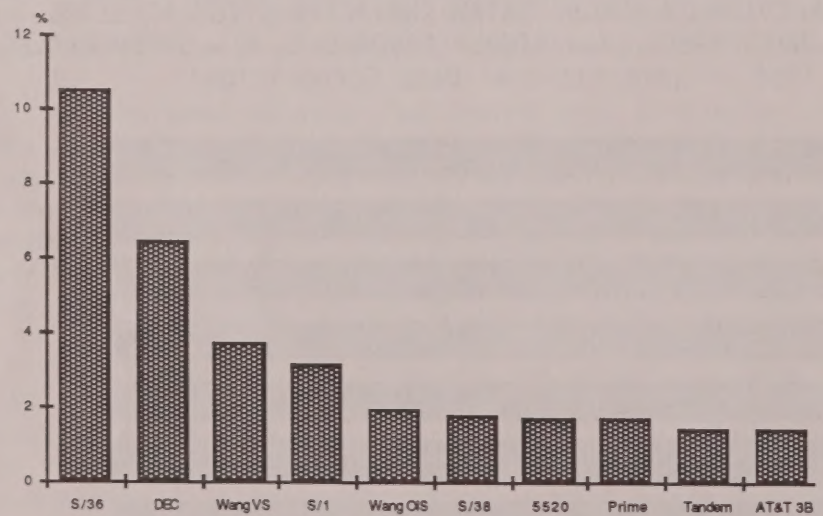


3,973 Systems Installed (Survey Base)

PERCENTAGE OF SITES RESPONDING TO MIGRATION STUDY
EXPECTING INCREASED USE OF PARTICULAR MULTIUSER SYSTEMS
(Copyright 1986 -- International Data Corporation)



Office Detonation

One factor cited in numerous post-mortems of last year's Great Softness was user dissatisfaction with office automation offerings and the existing level of communication between distributed departmental systems and computer room mainframes (typically IBM's). The survey respondents did in fact possess a bewildering variety of distributed multiuser systems. Over half had one or more, with an average of 5 CPUs per system per site. Of all sites with distributed systems, 31% were true-blue, while 44% mixed IBM products with other vendors' systems. That left a quarter without IBM distributed systems, but hardly exhausted the potential for incoherent communications. Two-thirds of the sites with non-IBM distributed systems had an IBM senior system.

All vendors in the distributed multiuser market are rushing to supply communication links, but users in the sample seem dubious about an immediate payoff. That at least appears the most likely explanation for one of the most striking results of this year's survey: for all the bad press System/36 has received, over 10% of respondents expected to install more S/36s in the future, while only 1% thought they'd have fewer. No other product or vendor even approached this figure (though Digital came closest, followed by Wang VS). IBM's ace-in-the-hole is still that MIS shops prefer the devil they know.

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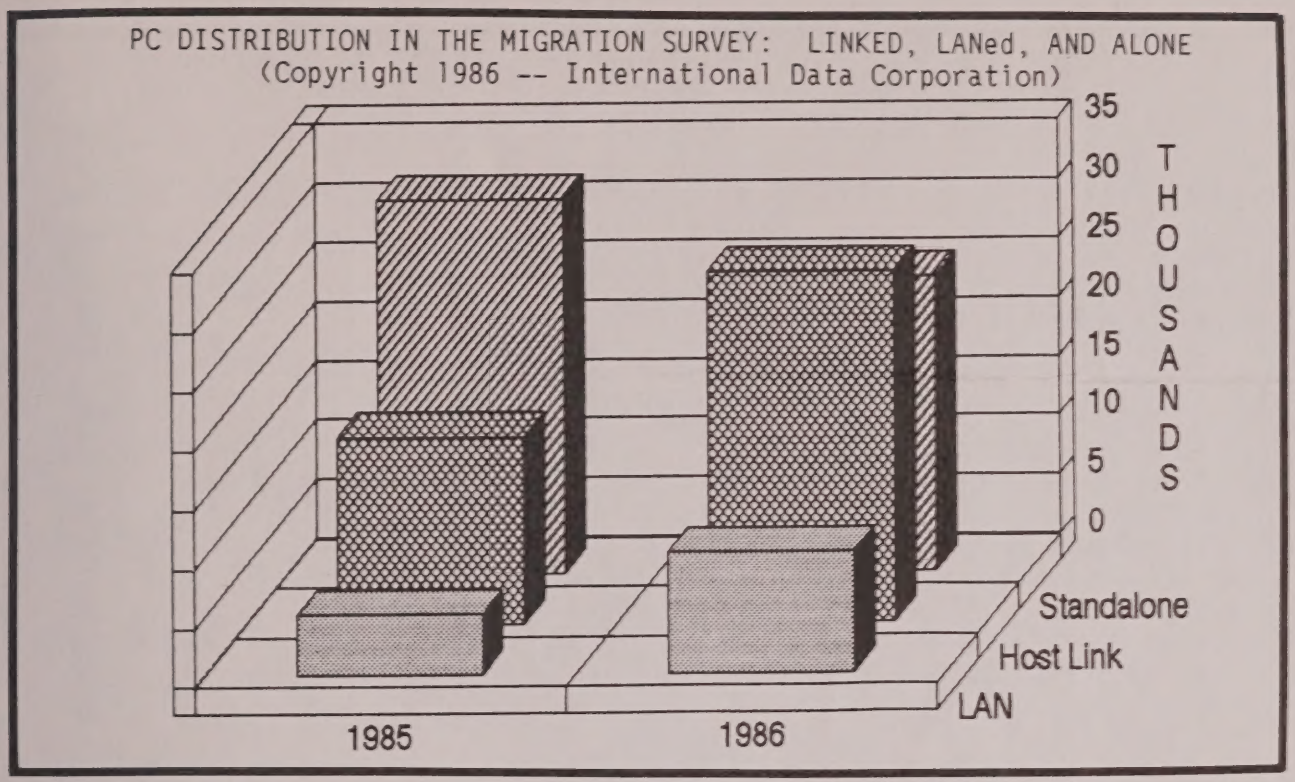

The PC Connection

If respondents' expectations prove valid, this could be a crucial transition year in the evolution of personal computers. At the end of 1985, 60% of their PCs were classic standalones, while the rest were linked to mainframes and/or tied together in a LAN. They think, however, that by December 1986, the ratios will have reversed, with standalones comprising only 40% of the total. This shift will occur as the number of PCs installed increases 23%.

The number of PCs linked to LANs is expected to double in 1986, although from a relatively small base. In 1985 only 10% of PCs in the sample were networked; in 1986, if plans work out, the percentage should increase to 16%.

Micro-to-mainframe links were already playing a role for one-third of the PCs in the survey, but respondents expected a 1986 growth rate in such connections almost equal to that for LANs. By the end of this year, they were contemplating links for almost half of all their PCs.

Hence respondents anticipated that this will be the year when the effect of micro-mainframe linkage on mainframe usage finally becomes clear. Around 60% felt that so few PCs were attached to their host systems that they could not yet feel any impact on mainframe usage one way or the other, but fewer than a third thought this would still be true in December 1986.

What may prove even more interesting, though, is the first indication in any IDC survey of a potential downsizing effect from such connectivity. Raw figures, like those in earlier surveys, still show low expectations that PCs will depress CPU requirements, and considerable faith that PCs will actually increase host usage. However, when these figures are broken down between sites with and without micro-mainframe links, thrice as many of the sites with actual experience in linkage feel that PCs lower mainframe CPU requirements.

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CRITICALITY OF PRODUCTS AND FEATURES IN SYSTEM SELECTION
(PERCENTAGE OF "MOST CRITICAL" REPLIES ON IDC'S MIGRATION STUDY)
(Copyright 1986 -- International Data Corporation)

Product/Feature	All Resp.	IBM Large	IBM Med.	BUNCH	Other*
99.9% Uptime	18	17	20	17	13
Database Management	12	12	12	15	14
Transaction Processing Perf.	11	11	12	15	11
Multiprocessing Options	11	11	10	1	13
SNA Support	8	12	8	6	3
Batch Performance	7	6	8	6	7
Subsecond Response Time	6	6	6	6	3
4th Generation Languages	5	4	5	6	5
Micro-Mainframe Links	4	3	5	6	5
Floating Point Performance	3	3	5	5	8
Saving Floor Space	3	4	3	3	1
Electronic Mail	2	3	3	2	3
Reducing Power/Cooling Costs	2	3	2	2	4
Mainframe Office Software	2	2	2	1	2
Graphics Software	2	2	1	1	3
Unix Support	1	1	1	1	2
Dedicated Database Machine	1	1	0	1	3
Optical Storage	1	0	1	1	2

*Other = Sites with small systems and unspecified mainframes.

The Changing Shopping List

The view from this corner is that the effect of PC-based downsizing on mainframe applications will probably not initiate a revolution in how large-scale systems are utilized; rather, its chief consequence may be to accelerate a transition already well under way. For several years, online transaction processing has been consuming more and more CPU time, while even without micro-to-mainframe links a lot of work that would once have been done in batch on mainframes has been appearing in PC spreadsheets and printouts.

This shift is graphically displayed in the results of this year's migration survey -- which, it might be noted, were for the first time entered and analyzed entirely on PCs. When asked which features and products were deemed most critical in system selection, respondents overwhelmingly pointed to characteristics associated with OLTP. Over 80% gave 99.9% uptime a ranking of 1 or 2 on a scale of 1 (most critical) to 5 (unimportant), while about 60% more gave transaction processing a 1 rating than anointed batch performance. The other two factors in processing's Final Four -- database management and multiprocessing options -- have gained in importance in part because of their association with transaction processing and high availability.

These results will probably surprise few vendors who have been feeling their customers' pulse. IBM, which conducts its own annual survey of its largest users, has obviously been getting results congruent with IDC's. It is no accident, as they say, that every IBM hardware announcement now emphasizes high availability, or that its recent DBMS revisions highlighted transaction processing. But end users these days all seem to hail from Missouri -- before they buy, they want vendors to show them more than ever before.

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"The Gray Sheet"

EDP industry report

● THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

D.C.BELLOMY, ASSOC.ED. FEB. 28, 1986 ● VOL.21, NO.21 P.J.MCGOVERN, PUBLISHER

HEWLETT-PACKARD DOWNPLAYS RISK IN NEW SPECTRUM SERIES

Finally reaching the banks of its corporate Rubicon, on February 25 Hewlett-Packard raised the standard for its new RISC-based Precision Architecture and published the order in which the first products would start to ford the stream by the end of the year. The company was able at last to say, The die is cast.

Still, Julius Caesar defying the Roman Senate this wasn't. Rather, HP is now between the Scylla of disappointed users and the Charybdis of bored analysts: users would like to see machines before the end of 1986, but many industry watchers found it difficult to get excited about products that had been so widely discussed for so many months.

The lack of high drama was probably intended. The company's delicate task has been to implement the revolutionary technology necessary to appeal to customers who had chosen HP in part because of its conservative image of technical expertise, not avant-garde adventuresomeness. So HP wants it both ways -- credit for its state-of-the-art RISC-based architecture, without scaring users with the obvious homonym of RISC. Ergo CEO John A. Young's announcement, "We're innovators at HP, not gamblers." Ergo the decision to play to the corporate image while downplaying RISC in the name Precision Architecture.

The task is easier because HP has ample justification for its marketing strategy. No one ever said, let's get out in front of everybody with the swingiest new concept in computing. What happened is that in 1981, HP faced two problems in planning for its next generation of computers:

- It lacked a VAXlike womb-to-tomb architecture across its offerings.
- Like every other vendor, it had to start supplying more performance.

An ongoing project codenamed Vision could have effected the second goal without affecting the first. Reduced Instruction Set Computer (RISC) principles, it was pointed out, could provide a relatively simple architecture that could bond the three principal families of HP multiuser computers, allow (alas, not expedite) migration to sleeker systems, and streamline future product cycles, while also providing faster performance. With the prospect of eventually achieving both goals, Vision's short-term performance boosts were sacrificed for the longer-range implications of what became the Spectrum project.

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The advantages of a RISC-based architecture would be that the most common instructions could run at faster rates (the reason for most of the interest to date in RISC from other vendors), and that the end run around interpretive microcode could sharply reduce the compatibility problems between various families of computers. But there were also widely discussed disadvantages. After all, IBM had completed the first RISC prototype, the 801, in 1980, the year Joel Birnbaum, now director of Hewlett-Packard Laboratories after serving as head of its Computer Research Center, left IBM's Watson Research Lab for HP. Yet the 801 was never brought to market. Its chip is now used for specialized I/O purposes in the 3090, while IBM's new RISC-based RT is positioned for a scientific/engineering niche, not general-purpose computing.

HP claims that over four years of intensive testing and measurements have either averted the pitfalls in RISC or achieved efficient trade-offs. One common complaint, that simple instructions just pass the complexity along to the compiler, has been largely obviated by the advent of new optimizing compilers. Precision Architecture performance figures have been adjusted somewhat to correlate to nonproprietary compilers, and thus may be a tad conservative.

A more serious accusation notes that breaking all complex instructions down into simpler single-cycle ones means that more instructions would be needed to process real-world applications and that an impressive increase in MIPS could actually mask a decrease in performance. Apollo, for example, has denigrated the RT by contrasting the "RISC-MIPS" in IBM literature to "real" MIPS.

HP has responded by blithely compromising the RISC credo at will. Fully 140 instructions are used, many of them multicycle like those in Complex Instruction Set Computer (CISC) systems, except that they are typically combinations of "millicode," which HP considers a more flexible form of microcode. Also, very complex tasks will often be handled by coprocessors. A floating point option, which parries the charge that RISC can't handle high-level arithmetic functions, will be available with the first Precision Architecture systems. Other coprocessors (e.g., graphics, signal processing, and encryption) will likely follow after Spectrum includes more technically oriented computers.

With its heavy investment in register-to-register instructions and a highly designed instruction set, HP is confident that its advertised MIPS are in fact real MIPS. But it adds a caveat: throughput time is not the same as MIPS, although it is a function of MIPS. The other factor is pathlength, or how many instructions are executed in any one application. While there is always a decrement from MIPS to throughput time, the dropoff in early Precision Architecture machines seems especially steep: the faster of the two systems boasts a MIPS rating over five times a 3000-68, but only three times the throughput.

HPeople strenuously affirm that the drop is not related to RISC. After algorithm and execution/storage tinkering, they say, pathlengths are not appreciably increased by RISC, while compilers can shorten some. Throughput, they feel, will be measurably increased over the coming years as the new operating system tuned for RISC is further refined, and some of the millicode is improved once engineers understand why certain applications run faster than others.

But one performance criterion, which is also a reason why other vendors have not embraced general-purpose RISC systems, remains something of a bugbear: software migration. HP has probably done about everything that it could do to ease the transition, but the fact remains that the problems are not trivial.

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3000 Family: Products and Prospects. The performance gap that had developed in the 3000 family of commercial processors dictated that the first Precision Architecture systems would be high-end additions atop current offerings. With the top-of-the-line 3000-68 yielding only around 1.3 MIPS, hardly a competitive performance when compared to other supermini vendors' products, HP had to wait before introducing RISC-based replacements for current models.

Users can't quarrel with the new computers' power or price/performance -- only the long wait until the delivery truck pulls up:

- Series 930. 4.5 native-mode MIPS in TTL-based five-card CPU cabinet. Throughput 2 X 3000-68. Base price w/ 16MB memory, new Allbase/XL DBMS, RISC-tuned MPE XL operating system, etc., $225,000. Available end of 1986.

- Series 950. Based on 6.7 MIPS (native-mode) on one NMOS-III chip. Throughput 3 X 3000-68. Base price w/ 24MB expected in $300-350,000 range. Orders accepted in 1987, delivery 2d half of year.

The price/performance of $50,000/MIPS is surpassed among major supermini vendors only by DG's new systems, while it is a tribute to the potential of Precision Architecture that so much performance could be wrung from off-the-shelf TTL chips on the 930. Future ECL-based RISC systems should be real screamers. But high-tech can take time -- one reason for the announcement delay and the wait for the 950 was problems in VLSI chip production.

Another reason apparently has been the difficulty in working out software conversion. As matters now stand, there are four options:

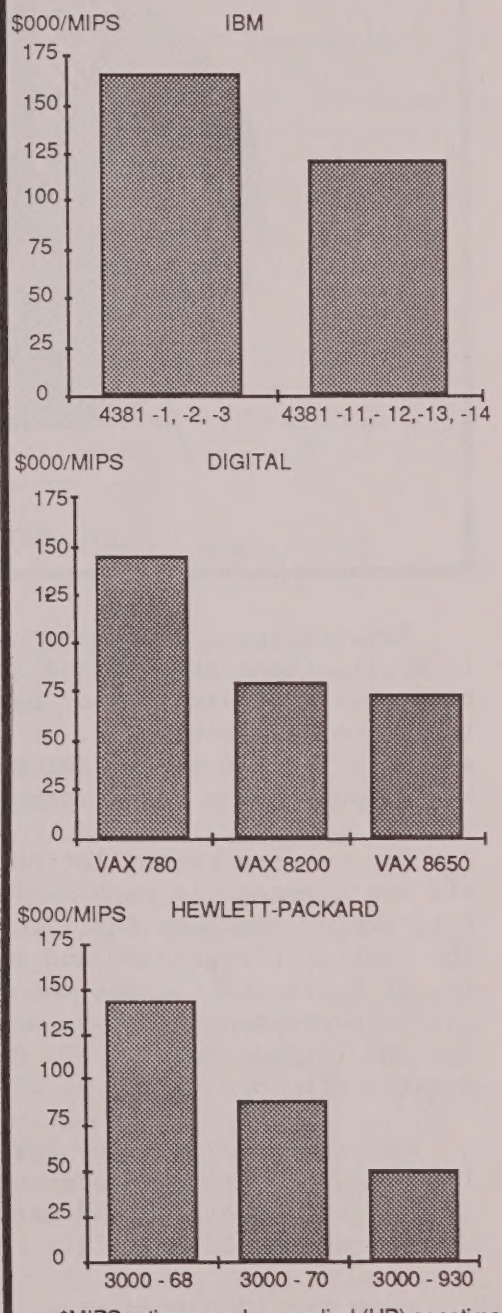
Native Mode. Any new software should offer full performance as advertised.

Emulation. HP has insured that object code written for the non-RISC 3000 family's MPE operating system will run on the new systems -- but with no performance boost over a 68.

Recompiling. This can bring most existing applications up to native-mode performance.

Rewriting code. A small fraction may find this necessary for some applications.

PRICE/PERFORMANCE ($/MIPS) OF NEW VS. OLD MEDIUM-SCALE SYSTEMS FROM IBM, DEC, AND HP*
(Copyright 1986 -- IDC)



*MIPS ratings vendor-supplied (HP) or estimated based on relative performance claims; IDC does not measure performance. Price for basic entry system rather than equivalent storage, etc. IBM prices for systems and processor prerequisites. HP prices include bundled system software.

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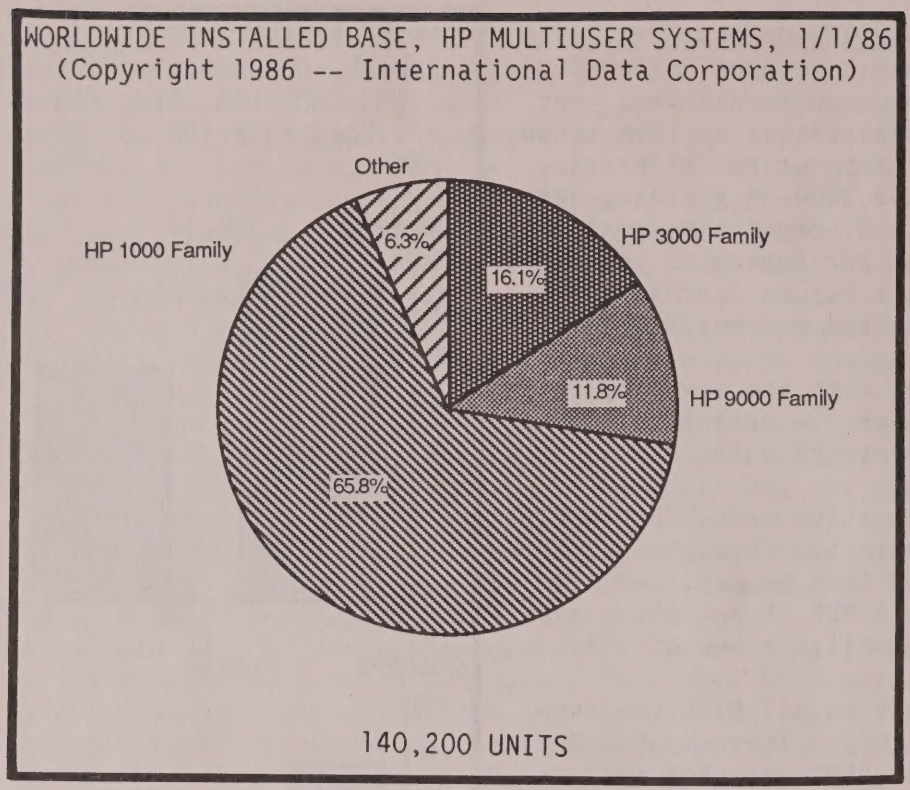

The transfer of applications from an older 3000 system is a weekend job, but users aren't going to spend around 21% more for a 930 than for a 68 to get the same performance. They will immediately start recompiling their most important applications, while running the rest in emulation mode. How long the transition takes will obviously vary, and HP doesn't want to make promises, but one exec told EDP/IR that total recompilation for large users will be "a matter of days and weeks, not months."

Nevertheless, hitches could remain in a significant proportion of cases. If applications are written in pure "C," Cobol, Fortran, or Pascal, recompilation should attain 100% of native-mode performance; but if other high-level languages have been used, or one of the four is adulterated, performance will suffer. For all the measurements in "Precision Architecture," estimates of the slippage have been imprecise -- 10% seems to be a rough ballpark figure.

In one case recompilation will offer no improvement -- since Spectrum models won't recognize machine languages, applications utilizing the old Systems Programming Language (SPL) for the 3000s will have to rewrite code or recompile the rest of the program and run the SPL routines in emulation mode. Fortunately, HP feels that it got the message out in time to customers that SPL would not be supported in future architectures to avoid major problems. Unfortunately, the largest user of SPL didn't get the message -- HP itself, which incorporated SPL in a number of its packages. These are now being rewritten.

Meanwhile, as a bonus for 3000 users who have been so patient, HP is offering a non-Spectrum replacement for the 68 with strong price/performance. The 3000-70 will yield 20-35% more performance (let's say, 1.7 MIPS) for 20% less money, and should help fill corporate coffers during the wait for Spectrum.

9000 and 1000 Products. Currently these are incompatible lines, with the 9000s running on Unix and the 1000s using HP's RTE real-time operating system. The plan is to meld them into one Spectrum architecture operating under HP-UX, a version of Unix tuned to include real-time extensions. The first product in the combined line, to be announced in midsummer for delivery coinciding with first 930 shipments, will be positioned as an area manager for A-Series 1000s. Transition to Precision Architecture will be slowest in this segment of HP's market, however, since it will be a long time before HP-UX approaches the real-time capabilities that the company feels that RTE currently exhibits.

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Precision Architecture and HP Prospects. The real risk would have been if HP had not acted to meet the compatibility and performance challenge flung by Digital, DG, Prime, and its other midmarket competitors. Even IBM, which can afford incompatibilities better than the smaller fish in the pond, can probably ascribe some of its medium/small-scale problems to user discomfort with its mulligan stew of systems. Digital has rejected several RISC projects allegedly because, as Ken Olsen puts it, they had to meet the VAX standard, and didn't. But that standard rests as much on compatibility as on the inherent performance of its notoriously CISC architecture. HP couldn't afford to be so cavalier.

Problems remain, both for HP and its users. Nevertheless, given the alternative, the company probably made the right choice in 1981.

APOLLO PLAYS PHOENIX WITH NEW PRODUCTS

The engineering/graphics workstation market has been a high-stakes poker game over the first two months of 1986. After sitting out the early hands, Apollo has now raised the ante with a completely redesigned line of workstations and a change in strategy. This year's game will see still more big pots and flush hands, but Apollo seems to win this turn of the cards -- it's not bluffing:

- Apollo now views the workstation market as a series of submarkets that have to be addressed with clearly differentiated products.

- It has bowed to its users' demand for operating system standards by emphasizing Domain/IX, its Unix offering, in the new workstations at the expense of its proprietary Aegis system.

- It is responding to PC CAD with a 32-bit "personal workstation" that looks like an AT, costs not that much more than an AT, will attach to AT peripherals, and eventually will be able to run AT programs.

- It is aggressively competing against the early 1986 winners (Sun, IBM, and Digital) with a raft of price/performance figures.

The Series 3000 Personal Workstation extends Apollo down to the high-end PC level with a Unix-based system offering the performance of Apollo's old line of workstations for about half the cost (diskless, $9,900 for monochrome, $14,900 for color; $4,500 for 72MB disk plus floppy). Apollo is thinking Blue thoughts about the 3000, which mimics an AT in size and keyboard while sporting an AT-compatible bus. More importantly, Apollo and Phoenix are working on a coprocessor board that will allow users to run AT software programs. Its absence at product introduction generated the only serious criticism from IDC analysts.

Apollo's comparison shopping guide often pitted the 3000 against IBM's RT. There was some smoke and mirrors -- Apollo insists that, in "Real MIPS," the RT's 1.6-2.1 is actually less than the 3000's 1.2 MIPS; and it downplays the fact that, for standalone color performance, the RT is cheaper. But in areas like resolution, floating point (only optional on the RT), and networking (Domain for the 3000, nada for the RT), the 3000 claims clear superiority.

The product differentiation also occurs in the DN580 and DN570, which replace existing high-end Apollo products. The 570, priced diskless at $29,900 with 15" monitor, with 69-306MB storage options, offers nearly triple the

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graphics performance (40,000 2D vectors/second) of the old DN560. The 580, though, is positioned for the real graphics buff. For $43,900 (diskless), the user gets over 100,000 2D V/S, and a $5,900 option of a 3D graphics accelerator that gives equivalent 3D performance. The graphics accelerator's virtual memory allows real-time display and manipulation of almost any size of object.

The new Apollo midlevel systems are quite competitive in graphics performance. The VAXStation II/GPX, after all, doesn't offer 3D, while graphics in the new Apollo systems are significantly faster than in today's high-end Sun color workstation. In 2D the 570 and Sun's 3/160C are equal, but Apollo configurations are $8,000-10,000 cheaper. The 3/160C beats the 570 in 3D, but gives only a quarter of the 3D speed of the 580 with graphics accelerator. Apollo's zippy 3D, though, does begin at $12,000 more than the Sun entry point.

Balancing its nod downwards with the Series 3000, Apollo has also officially introduced its high-end compute server from Alliant. Dubbed the DSP9000 in its Apollo incarnation, it will allegedly offer in single-CPU configuration the performance of Digital's new compute server for VAXClusters, the 8800, for half the price. However, how Apollo equates performance it rates as 8 X a 1-MIPS workstation with an 8800 running at up to 12 X a 1-MIPS 8200 is not intuitively obvious. The answer may lie somewhere in the no-man's-land between MIPS and MFLOPS, but we need more guidance from Apollo/Alliant and Digital on how they are measuring performance. In any case, the DSP9000 is expandable to 8 parallel processing computational elements for up to a claimed 94 MFLOPS/35 MIPS.

All the new systems play to the strengths of Apollo's Domain operating environment, but the company is becoming much more open to nonproprietary standards. Apollo even intimated in response to a question at the announcement ceremonies that it would publish the specs on Domain if demand grew. But the real story is Unix. Not only is Apollo shifting to the Unix universe, but earlier in February it announced an agreement with AT&T to enhance Domain/IX to meet the System V Interface Definition. Apollo is particularly interested in participating in RFS, the transparent file sharing facility that AT&T is preparing for future Unix-V releases, since the project, if widely accepted by other vendors, could stymie some of the momentum building behind Sun's NFS.

In Apollo's book, Sun is still just the low-cost, low-functionality workstation vendor, while its real rivals are IBM and Digital, neither of whom, it argues, can match the new Apollo lineup. However, the workstation market is currently too fluid to insure Apollo more than a few months of breathing space. Sun, for example, is expected to announce its next move this spring, perhaps next-generation graphics products and/or a more extensive networking scheme. Both IBM and Digital have somewhat contrasting installed bases to build from. And then there's the company Apollo didn't mention except for nebulous dismissals of "niche players." For really heavy duty CAD/CAE/CAM applications like solid modeling, no other workstation vendor matches the real-time graphics performance Silicon Graphics achieves with its custom VLSI circuits, at a price comparable to Apollo's. There have been rumors of lucrative OEM deals in the works that could partially alter Silicon Graphics' niche image.

But this is Apollo's moment. While it is too early to judge end user reaction, OEMs, some of whom had been getting antsy about their ties with Apollo, seem pleased. Their enthusiasm for the new workstations is an auspicious sign that, even if Apollo doesn't regain the beanstalk growth of the first half of 1985, its precipitous decline of the second half has been checked.

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VENDOR-SUPPLIED FEATURES AND GRAPHICS PERFORMANCE OF LEADING ENGINEERING WORKSTATIONS

Product	Price*	Op.System	Whtstn**	Fl Pt Acc	Graphics	Clrs/Pltte	Resol.	Bit Pl	Main Mem	Storage	Netwrk
Apollo											
DN560	$38-46.4K	Aegis, Domain/IX	806,000	68881	32-bit bit-slc	256/16M	1024X800	4	2-3MB; 64MB VAS***	86-172MB	Domain Etherbrdg
DN570	$36/36-60K	Domain/IX	850,000	68881 FPX opt	VLSI proc	256/16M	1024X800	8	2-16MB; 64MB VAS***	86-360MB	Domain Etherbrdg
DN580	$44-80K $10K 3DGA	Domain/IX	850,000	68881 FPX opt	VLSI proc 3D acc.opt.	256/16M	1280X1024	8	2-16MB; 64MB VAS***	86-360MB	Domain Etherbrdg
Sun											
3/160C GP	$32-45K $5.9K GP	Unix4.2	860,000	68881 + option	GP opt.	256/16M	1152X768	8	2-16MB; 256MB Virt	71-380MB	Ethernet NFS,TCP/IP
Silicon Graphics											
2400	$24.9K	UnixV	61,000	opt	10-12 gt array	4096/16M	1024X768	8-32	1.5-15MB; 14MB Virt	72MB	Ethernet XNS,TCP/IP
3000 Ser	$35-55K	UnixV	214,000	opt	8Mhz VLSI	4096/16M	1024X768	8-32	2-16MB; 64MB Virt	20-340MB	Ethernet XNS,TCP/IP
Digital											
VAXStn II GPX	$33-53K	Ultrix VMS	925,000	78132 (prop.)	GPX VLSI	16-256/ 256	1024X864	4-8	3-9MB 4GB Virt	71-213MB	Decnet, Ethernet TCP/IP,NFS
IBM											
PC RT/ 5080	$48.2K	AIX	200,000	opt.	bit slc (IBM)	256/ 32,768	1024X1024	8	1-4MB	40-210MB	None

*Price starting with minimal standalone configuration (i.e., with disk) **Single-precision Whetstone ratings without optional floating point accelerator ***VAS = Virtual Address Space

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• A BLUE NEW YEAR FOR IBM. Big Blue had investors reaching for their TUMS with a prediction that its anxiety about 1986 revenues will depress earnings in the first quarter, and maybe beyond. It ascribes slack demand to low U.S. capital-equipment spending, which it anticipates this year will be below the unimpressive 1985 growth rate, and lower growth internationally as foreign users pause from their spending spree. In any case, IBM is trying to pump up demand in a tried-but-only-sometimes-true fashion: cutting prices, and thus sacrificing profit margins, in the hope of stimulating sales. Some expect IBM also to respond in a less Spartan fashion with another across-the-board rise in software leasing rates, which may not help the bottom line any more than the 1985 increase did. Even though the Programs Products growth rate in 1985 was 30.3%, the segment was still only 8.3% of IBM annual revenue, up from 7%.

• ADDING INSULTS TO INJURY IN ARMONK. First the IRS awarded its laptop contract to Zenith rather than IBM (not necessarily a body blow if, as many suspect, the laptop market still needs a year or two of technological tinkering). Then, when IBM's stock slipped $2.375 after it released its gloomy prognosis on February 27, Digital's pole-vaulted $5.50 to $172 the same day. At least when IBM's fell another $5 to $150.875 on February 28, Digital's also slipped $3.625 as investors got concerned about the computer market as a whole.

• 370-ON-A-CHIP. In a far more auspicious announcement, IBM has unveiled "Micro-370," a 32-bit microprocessor with over 100 of the most used System/370 instructions. The rest, to be stored on other chips or in memory, would be available through software emulation. Though designed for 10Mhz, the Micro-370 chip has been tested up to 18Mhz. IBM has also reported success in two RAM chip experiments, one a 3ns bipolar chip, the other using CMOS technology.

• NEW COMPAQ GENERATION. Compaq has filled in the performance gap for users who want a portable that gives more juice but maintains complete compatibility for their IBM PC products and costs less than Compaq's AT-compatible Portable 286. Because the Compaq Portable II is based on the 80286 chip (with the ability to switch between 6 and 8Mhz) rather than the 4.77Mhz 8088 chip in the PC, Compaq Portable, and Compaq Plus, it offers three to five times the performance at 8Mhz. It is also more truly portable than its predecessor, at 23.6-26.2 lbs. rather than 28.5-31.5, and more easily stowed (7.5" high, 17.7" wide, 13.9" deep, compared to the Portable's 8.5"X20"X16"). Up to an additional 1.5MB of RAM are available on a system "daughter board" that slips under the PC and keeps the slots free. A single-floppy Model 1 will go for a suggested $3,499, the dual-floppy Model 2 for $3,599, and the floppy/10MB hard disk Model 3 for $4,799, compared to $2,199 for an original dual-floppy Compaq Portable (after a $500 price cut) and $4,499-$6,999 for Portable 286 models.

• DIGITAL JOINS OSI TRANSPORTATION REVOLUTION. To begin fulfilling its promise of last year to start modifying the lower layers of its Digital Network Architecture (DNA) to conform better to OSI protocols, Digital has announced a software implementation of the crucial fourth layer (transport) of OSI. The VAX OSI Transport Service (VOTS) will offer a task-to-task interface to move data between VAX/VMS programs and other vendors' OSI-based programs. It claims to be the first major vendor to announce OSI-compatible software, and the only company to offer OSI support for both LANs and WANs. Digital defines VOTS as an interim solution until OSI application protocols are fully standardized.

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EDP industry report

● THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"The Gray Sheet"

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IBM'S INSURANCE POLICIES FOR 1986: NEW 3090, 4381 PRODUCTS

Almost one year to the day after the unveiling of the 3090 family, IBM made its first two additions to the series. Of even greater import than new 3090 and 4381 systems, though, were the signals indicating how IBM is viewing 1986 after a year in which "each day is like a year,/ A year whose days are long."

IBM for one doesn't seem to think that the strong fourth quarter reported by the majority of vendors offers any guarantees for '86. Rather, as stockholders were told in the IBM annual report, "There is an absence of convincing evidence the North American economy is showing sustained improvement, and we are approaching 1986 with caution." Ironically, caution in this case means vigorous action -- aggressive pricing and cutting losses wherever possible.

It is in the context of the anticipated fierce competition for user dollars in a year of at best moderate growth that IBM's announcements should be read:

- The decision to announce not just one but two uniprocessor 3090 models marks IBM's quiet obsequies for the 308X line.
- Since IBM still has 308X inventory to dispose of, it has gutted processor, conversion, and memory upgrade prices 17-24% on the 308X systems most likely to be compared to 3090s -- middle and high-end "X" models -- and only a token amount elsewhere.
- Probably because demand for 3090-200s has been below corporate expectations, prices have been cut 10% on 200s and 400s, which, it has been announced, will be available as separate systems and not just upgrades from 200s when they begin to ship in the fourth quarter.
- The price/performance problems depressing 4381 sales have been addressed with a vengeance: four replacement models netting out to around 30% better price/performance in commercial processing.
- The deepest concern of IBM users -- high availability -- is being met with product enhancements and a crescendo of rhetoric.
- The new market on which IBM is betting heaviest is scientific/engineering processing, where it will be tackling competitors head-on.

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3090 Uniprocessors. One plausible scenario would have brought just one 3090 uniprocessor on stage on February 11: the 180, essentially (despite the numbering) half of the dyadic 200. But it shared the spotlight with a slightly "detuned" Model 150 uniprocessor, which also lacks the expanded storage option that has been one of the key innovations in the other 3090 mainframes (on February 11 IBM also doubled expanded storage capacity on the 200 and 400).

Each new processor erodes more 308X territory. The 180 is rated by IBM at 1.7 to 1.8 times faster than a 3083-JX in commercial applications (let's call it a little over 14 MIPS, to maintain the gauge that many users prefer), and 1.9 to 2.1 times swifter in scientific/engineering applications (4 to 9 times faster if the Vector Facility option is applied). This brings upgradable 3090 commercial performance down into the 12-15 MIPS range of the 3081-GX and -KX.

The 150 marks the deepest penetration to date (and probably the deepest planned) into 308Xdom. IBM says it will clock in with a performance about two-thirds what a 180 shows, or 1.1 to 1.2 times faster than a 3083-JX (at the risk of being overfastidious, let's call it 9.4 MIPS this time). A similar performance bonus occurs in scientific/engineering processing, which in nonvector applications should run 1.2 to 1.3 times faster than a 3083-JX. And this time the JX is the true comparison, alongside the slightly slower 3083-BX. Given a choice between an 8-MIPS JX at $1.42 million (including the prereqs to make the processor run) and a 9-MIPS 3090-150 at $1.75 million, with an opportunity to upgrade to nearly 50 MIPS, most users will opt to join the 3090 generation.

IBM realizes this without wanting to publicly acknowledge it. To save what 308X sales it can, it has announced price cuts on the 3083-BX and -JX, the 3081-GX and -KX, and the 3084-QX ranging from 17 to 24%. Upgrades between families (e.g., from a 3083 to a 3081) will cost 13-20% less, while within families (say, from a 3081-GX to a -KX) upgrades will be real bargains at 30-45% less. The idea is obviously to clear inventory of the models with which the 3090 line most directly competes; prices on the low-end (3-4 MIPS) 3083-CX and -EX are being trimmed only 3-6%, while the antiquated "base" models (3083-E, 3081-G, etc.) are barely grazed by 1-2% price cuts.

The new 308X pricing had to dive so low to come in under what had been the price/performance differential between the old and new mainframe lines, since simultaneously 3090-200 and 400 prices were being cut around 10% (in the latter instance, still 9-11 months before it actually ships). Expanded storage costs were also lowered 15-18%. Mainframe price cuts are semiannual affairs at IBM, but 10% is on the steep side of the usual price slope. Corporate strategists probably feel that potential 3090 buyers have been a little slow in signing on (at least too slow to bring in as much 4Q income as they had been hoping for), and hence want to offer whatever incentive they can to stimulate sales.

4381 Replacement Models. Last year it was IBM's turn to cry. Digital had been losing in performance comparisons with IBM's 4381 superminis until the 8600 finally shipped. But with new machines from Digital and virtually every other vendor priced to undercut the 4381, the IBM supermini line was badly battered last year, especially, sales reps have moaned, in bid situations.

Ergo the most aggressive price/performance package from IBM in a long time: four new 4381 models replacing the three existing 4381s and the 4341, with about 33% more punch for a lower price. For example, the 4381-1 yields to the 4381-12, which costs $10,000 less for MIPS equal to what a 4381-2 offered.

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NEW IBM 4381 MODELS -11, -12, -13, AND -14

Mod	Replaces	# Proc.	Proc. Spd.	MIPS*	Stan. Chan.	Opt. Chan.	Mem. Range	Mem. Buf.	Flr Sp Sq.Ft.	Base Price**	Mthly Maint	Base $/MIPS	Avail. ***
-11	4341	1	68ns	1.5	6	6	4-16MB	4KB	24	$188.4K	$503	$126.5K	May 86
-12	4381-1	1	68ns	2.8	6	6	8-32MB	32KB	48	$333.4K	$656	$118.2K	Apr 86
-13	4381-2	1	56ns	3.7	6	6	8-32MB	64KB	48	$443.4K	$756	$120.5K	Apr 86
-14	4381-3	2	56ns	6.2	12	6	16-32MB	64KB	192	$738.4K	$846	$119.7K	Apr 86

*Est. from IBM relative performance claims. IBM doesn't use MIPS; IDC doesn't measure performance.

**Base price includes processor, minimal memory option, and a 3278-2A with 4632.

***Existing orders for models to be replaced will be filled with new models, effective immediately.

As kickers go, the new 4381s are white lightning. The best buys are the two high-end models (one a little under 4, the other a dual processor just over 6 MIPS), which have to stack up against new competitors like Digital's 8600 and 8650. They sport a different processor chip (Models 11 and 12 run at 68ns, 13 and 14 at 56ns), and the same 64K high-speed buffers that come with the 3090.

The new 4381s should therefore stanch a lot of IBM's supermini bleeding in 1986. In the long run, though, they might actually depress profits. When a replacement family for the 4381s is introduced, possibly in late 1987, it will have to meet the price/performance standards set by this month's models.

IBM 3090 MODELS -150, -180, -200, -400

Mod	# Proc.	Proc. Spd.	MIPS*	Stnd Chan	Opt Chan	Memory	Expnd. Storage	Mem Buf.	VF Opt	Fl Sp Sq Ft	Base Price**	Mthly Maint	Base $/MIPS	Avail.
150	1	18.5ns	9.4	16	8	32 or 64MB	None	64KB	1	512	$1.75M	$2,400	$186.6K	Oct 86
180	1	18.5ns	14.3	16	8, 16	32 or 64MB	64,128,192 or 256MB	64KB	1	512	$2.65M	$2,870	$185.4K	Apr 86
200	2	18.5ns	27.2	32	8, 16	64MB	64,128,192 or 256MB	2X64KB	2	2,048	$4.58M	$5,900	$168.4K	Now***
400	4	18.5ns	49.0	64	16, 32	128MB	128,256,384 or 512MB	4X 64KB	4	8,192	$8.67M	$11.9K	$176.9K	4Q86

*Est. from IBM relative performance claims. IBM doesn't use MIPS; IDC doesn't measure performance.

**Base price includes standard CPU, memory plus processor prereqs (e.g., 3092-1, 3097-1, 3089-3, etc.).

***Expanded storage options of 192 and 256MB available April 1986.

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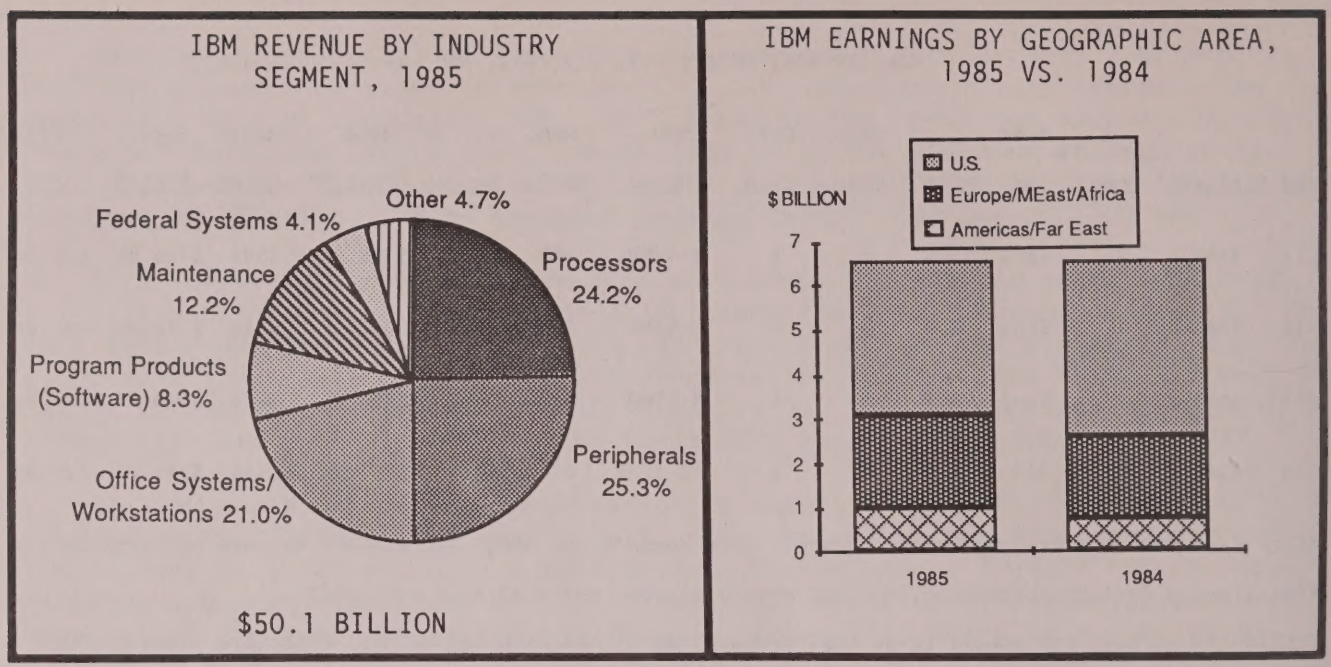

High Availability. From IBM's reiteration that new products and enhancements add to uptime and to data recovery after the rare downer, an outsider could probably guess that the rising concern among IBM users of late has been higher availability. This year's IBM Migration Study by IDC testifies to the trend -- asked to rank 18 products and features by their importance to system selection, respondents listed as the most critical "99.9% uptime." (Other trends from the 1986 Migration Study will be displayed in the next issue.)

February's new products show IBM extending its high-availability perimeter. The new release of SQL/DS, for example, is geared in its entirety to improving availability and recovery (e.g., it is now easier to isolate failures, and users need only back up changes in the database, not the entire database). All 3090 materials stress the reliability and availability offered by features like the duplexed functions in the 3092 processor controller, channel recovery, and dynamic page deallocation. The new 4381s offer a number of protective devices, including limited double-bit error correction and page protection in XA mode. Expect subsequent 1986 announcements to stretch the perimeter ever further.

Scientific/Engineering Applications. The 3090 has borne much of the brunt of the renewed emphasis on this market (both the 150 and 180, for instance, can attach the Vector Facility). Now IBM has also decided to heat up the contest for scientific/engineering users between 4381s and the VAX line. In a brochure on 4381s in compute-intensive processing, IBM compares MFLOPS performance on the LINPACK benchmark to the Argonne National Laboratory measures of DEC and DG machines (supposedly the 4381-11 is a little under the VAX 8600's .6 MFLOPS, the 12 is 1.2 MFLOPS, and the 13 over 1.5 -- the new 8800, though, will prove a more redoubtable adversary). A new software support system for entry-level users is also described as particularly relevant for this market, which often lacks the DP professionals common in commercial environments.

If high-availability enhancements are defensive measures to placate its installed base, IBM's moves to develop the scientific market are needed if it is to meet its growth targets. But just as Digital has had to retool its marketing for commercial users, IBM will have to adjust its marketing infrastructure to address an entirely different set of hardware and software requirements.

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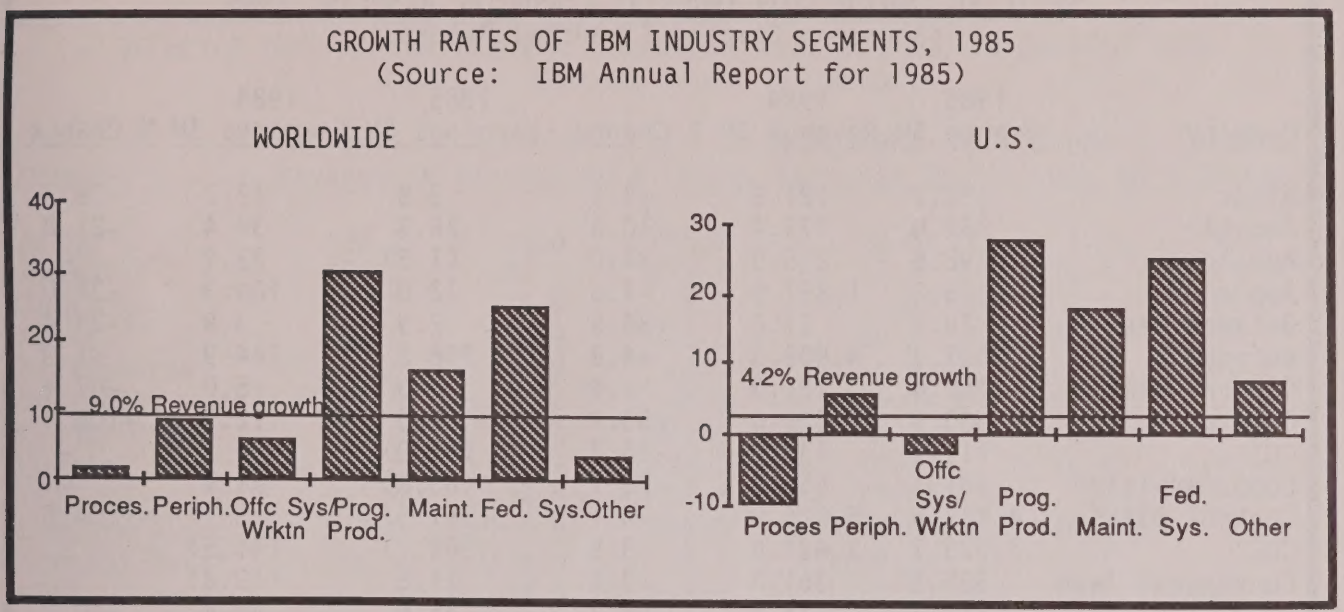

COUNTING THE CASUALTIES: 1985 FINANCIAL REPORTS

For small-town girls and soft summer nights, it quite likely was a very good year. Almost every year is. But for the computer industry, 1985 stunk. The strong 4Q results that many vendors reported usually did not fully compensate for the the first three quarters, and do not necessarily presage a rebound in 1986. The most complete and important testimony to date can be found in IBM's annual report, which quantifies trends of wide significance for all vendors:

- IBM's failure to register a gain in annual income was due to weakness in the U.S., where net earnings were down 13.3%. The Europe/Middle East/Africa and Americas/Far East sectors climbed 12.3% and 36.3% respectively. After contributing over 60% of total earnings in 1983 and 1984, the U.S. share of the pot fell to 52.6% last year.

- Processors (i.e., multiuser systems) brought in more revenue internationally than domestically in 1985 because revenue from abroad climbed 15.1%, while in the U.S. it dropped 9.6%. The net result was overall growth under 2%, compared to processor revenue growth of almost 12% in 1984.

- The Office Systems/Workstations revenue sector, which burgeoned 25.8% in 1984 on the strength of PC sales, inched up only 5.8% in 1985, and actually slipped 2.5% in the U.S.

- IBM's overall 9.0% revenue growth in 1985 derived not from hardware but from peripherals (8.8%), software (30.3%), maintenance (16.0%), and special projects for the federal government (25.0%). Even so, growth rates for software and federal systems lagged behind 1984.

In revenue, IBM stayed at the same proportion (48.1%) of the industry sample of 37 companies that EDP/IR has been employing for 1985 (see Vol. 21, No. 13, November 7, 1985) that it held in 1984. Its 9.0% growth matched the sample growth of 8.9%. However, while its earnings disappointed investors, IBM compared favorably to other vendors in the sample, whose earnings fell 14.8%.

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SELECTED INFORMATION INDUSTRY FINANCIAL RESULTS, 1985
(Source: Company Financial Reports)

Company	1985 Revenue $M	1984 Revenue $M	% Change	1985 Earnings $M	1984 Earnings $M	% Change
Altos	132.2	121.8	+8.5	9.8	12.2	-19.7
Amdahl	862.0	779.4	+10.6	28.7	36.4	-21.2
Apollo	295.6	215.9	+37.0	(1.5)	23.9	-
Apple	1,753.9	1,897.9	-7.6	72.0	104.3	-31.0
Britton Lee	29.1	21.6	+34.6	2.9	3.8	-24.4
Burroughs	5,037.7	4,808.3	+4.8	248.2	244.9	+1.3
Cipher Data	152.6	151.3	+.8	7.9	15.0	-47.4
Compaq	503.9	329.0	+53.1	26.6	12.9	+106.7
CCI	111.9	131.2	-14.7	(41.9)	6.3	-
Computervision	441.1	556.3	-20.7	(80.8)	41.4	-
Control Data*	4,822.6	5,026.9	-4.1	(567.5)	5.1	-1164.5
CDC*	3,679.7	3,692.6	-3.5	(562.7)	(44.5)	-
Convergent Tech	395.2	361.8	+9.2	11.5	(13.8)	-
Cray	380.2	228.8	+66.2	75.6	45.4	+40.2
Data General	1,298.9	1,254.2	+3.6	3.1	96.2	-96.8
Digital	6,461.1	5,749.9	+12.4	400.5	487.0	-17.8
EDS	3,444.7	947.4	+263.6	189.8	80.7	+135.2
Gould	1,420.1	1,399.4	+1.5	(175.7)	17.8	-
Hewlett-Packard*	6,571.0	6,297.0	+4.4	482.0	564.0	-14.5
Honeywell	6,624.6	6,073.6	+9.1	281.6	239.0	+17.8
HIS*	1,952.0	1,825.0	+7.0	200.0	180.0	+11.1
IBM	50,056.0	45,937.0	+9.0	6,555.0	6,582.0	-.4
Intel	1,365.0	1,629.3	-16.2	1.6	198.2	-99.2
Lee Data	89.4	100.9	-11.4	(1.5)	10.5	-
Lotus	225.5	157.0	+43.7	38.2	36.0	+5.8
MSA	151.7	141.8	+ 6.9	6.9	.2	+2723.0
Mentor	136.7	87.9	+55.6	8.0	9.9	-19.2
Miniscribe	114.0	123.6	-7.8	(16.8)	(5.7)	-194.7
NCR	4,317.2	4,074.3	+6.0	315.2	342.6	-8.0
National Semi	1,605.9	1,818.0	-17.5	(89.5)	84.3	-
Priam	118.2	102.1	+15.8	(9.8)	(7.9)	-24.0
Prime	769.7	642.8	+19.7	57.8	52.3	+10.5
Quantum	126.6	109.2	+16.0	21.4	18.1	+18.1
Seagate	303.6	304.0	-.1	8.7	21.7	-49.9
Storage Tek	673.4	808.6	-16.7	(57.4)	(505.5)	+88.6
Stratus	80.1	42.1	+90.2	8.6	5.4	+59.1
Tandem	634.5	565.9	+12.1	32.0	46.9	-31.8
Ungermann-Bass	72.2	52.3	+38.0	3.7	6.3	-40.8
Wang	2,428.3	2,421.1	+.3	(63.3)	231.0	-
Sample Total	104,006.4	95,469.6	+8.9	7,791.6	9,148.8	-14.8

*CDC for 4Q and the year for the first time segregated Commercial Credit from other activities. The "Control Data" figure combines Control Data and Commercial Credit amounts; the "CDC" figure represents the new method of calculation. For purposes of comparison, the "Control Data" figure was used in computing totals. H-P is for quarters running Feb 1985-Jan 1986. HIS figures represent Honeywell's information systems revenue and operating profit before unallocated deductions; because HIS income is reported only once a year, overall Honeywell figures are used in the Sample Total to correspond to quarterly samples.

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SELECTED INFORMATION INDUSTRY FINANCIAL RESULTS, FOURTH QUARTER 1985
(Source: Company Financial Reports)

Company	4Q 1985 Revenue $M	4Q 1984 Revenue $M	% Change	4Q 1985 Earnings $M	4Q 1984 Earnings $M	% Change
Altos	36.0	26.6	+35.3	2.6	1.7	+52.9
Amdahl	257.2	227.4	+13.1	13.7	16.1	-15.0
Apollo	70.7	75.9	-6.8	.7	8.4	-91.2
Apple	533.9	698.3	-23.5	56.9	46.1	+23.5
Britton Lee	7.4	6.9	+8.0	.4	1.2	-70.2
Burroughs	1,480.3	1,371.2	+8.0	115.3	94.4	+22.1
Cipher Data	37.0	47.3	-21.8	1.0	4.6	-77.7
Compaq	156.3	112.7	+38.7	10.0	6.8	+46.6
CCI	25.4	34.5	-26.3	(27.6)	.8	-
Computervision	117.2	163.9	-28.5	(27.0)	14.9	-
Control Data*	1,256.4	1,338.0	-6.1	(297.9)	4.5	-
CDC*	981.4	1,014.9	-3.3	(267.5)	(17.5)	-1428.6
Convergent Tech	99.8	115.5	-13.5	5.1	(11.9)	-
Cray	84.7	70.9	+19.5	12.0	16.0	-24.7
Data General	198.4	262.4	-24.4	1.1	23.0	-95.2
Digital	1,862.5	1,628.1	+14.4	136.1	110.3	+23.4
EDS	1,078.5	280.7	+284.2	57.4	23.2	+147.7
Gould	354.3	253.0	+40.0	(65.1)	(45.1)	-44.3
Hewlett-Packard*	1,597.0	1,531.0	+4.3	109.0	116.0	-6.0
Honeywell	2,028.1	1,749.5	+15.9	127.2	31.8	+300.0
IBM	17,155.0	14,496.0	+18.4	2,681.0	2,172.0	+23.4
Intel	317.9	416.1	-23.6	(14.9)	23.2	-
Lee Data	23.3	23.6	+1.2	1.4	1.6	-7.3
Lotus	71.8	50.4	+42.5	11.4	11.8	-3.3
MSA	57.6	56.4	+2.2	10.0	3.2	+211.7
Mentor	36.3	30.7	+19.4	1.7	3.1	-45.8
Miniscribe	35.6	28.1	+26.6	2.5	(6.9)	-
NCR	1,405.3	1,257.4	+11.8	133.2	124.0	+7.5
National Semi	359.4	435.4	-17.5	(34.8)	8.5	-
Priam	33.8	25.3	+33.6	1.8	(8.9)	-
Prime	209.9	170.8	+22.9	17.5	14.8	+17.7
Quantum	30.5	31.8	-4.2	5.2	5.9	-12.3
Seagate	101.0	51.8	+95.2	4.6	(.9)	-
Storage Tek	168.6	151.9	+11.0	1.1	(419.2)	-
Stratus	25.3	14.1	+79.8	3.0	1.5	+97.3
Tandem	170.1	159.7	+6.5	11.6	14.0	-17.0
Ungermann-Bass	22.5	15.3	+47.4	1.6	2.1	-21.8
Wang	679.5	610.0	+11.4	21.7	56.3	-61.5
Sample Total	32,184.5	27,765.6	+15.9	3,090.5	2,468.9	+25.2

*For differences between "Control Data" and "CDC," see annual list on the previous page. H-P is for quarter ending January 31, 1986 and 1985.

There were big winners and big losers balancing the sample scales. EDS raced its engines with fuel from General Motors' MAP project, while Compaq, Stratus, and Cray proved that small competitors with viable products and efficient marketing strategies can weather industry slowdowns. Honeywell and Prime beat the earnings odds, while Storage Tek's nose edged towards the surface. Then there's CDC, whose 1985 loss exceeded even Storage Tek's record in 1984.

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• IBM GOES ALL-RELATIONAL IN DBMS OFFERINGS. The new releases of DB2 and SQL/DS announced on February 4 have allegedly repositioned the two relational database programs as the primary products for most DBMS users. DB2 supposedly now has the performance and capacity to support not just reports and queries but all applications, including transaction processing. It will be targeted at largish users who do not yet require IMS Fastpath or TPF, while SQL/DS, which has received high-availability enhancements, will cover the intermediate field.

• IBM RESHUFFLES S/1, S/88. Moving Series/1 from the Systems Products Division to Communications Products makes sense, since IBM has been billing them as the "communicating 1s." More intriguing is the decision to do the same thing with System/88, which seems to indicate a cutback in IBM's plans for the Stratus boxes by viewing them as basically communications processors.

• HONEYWELL'S JAPAN CONNECTION, TAKE TWO. With word that NEC's System 2000 Series unveiled in Tokyo on February 4 would form the basis of future DPS mainframe computers, Honeywell confirmed that its NECing party would continue.

• CORPORATION FOR OPEN SYSTEMS AT 21, ATTAINS MATURITY WITH IBM MEMBERSHIP. The lobbying group for international industry standards (e.g., the ISO's OSI) received needed validation as something more than a gaggle of anti-IBM vendors when IBM agreed to join as the 21st member. COS's 17 founding members were Amdahl, AT&T, Bell Communications Research, Burroughs, CDC, Digital, Harris, H-P, Honeywell, NCR, National Semi, Northern Telecom, Sperry, Tandem, Telex, Wang, and Xerox. Intel, Convergent Tech, and Prime cast their lot with COS before IBM did, while GTE Telenet, Pacific Bell, and Apple have piped in since.

• COMPUTERVISION SHAKE-UP. The one-time CAD/CAM leader's recent travails have led to the resignation of James R. Berrett as president/CEO and director, and the appointment of the vice chairman/COO, Robert L. Gable, to succeed him. An explanation (if needed) came a couple of days later with 4Q and 1985 financial results; revenue dips and losses were more severe than many anticipated.

• EVEN-STEVEN FOR SEMICONDUCTORS. For the first time in almost a year and a half, the SIA reports that the U.S. book-to-bill ratio is above 1.0, at 1.04.

• SURVIVORS' BENEFITS. Following Sun's lead, Microsoft and Oracle are now reaping the reward of escaping 1985 intact by filing with the SEC to go public.

• RETURN OF THE JEDI. The apple of Steve Jobs' eye is now George Lucas. Jobs, "a young industrialist," has acquired majority interest in Pixar, formerly Lucasfilm's computer graphics division. Its first product will be the image computer that Lucasfilms has employed for sharp but relatively inexpensive graphics. Selling to commercial/scientific markets (e.g., medicine, printing, remote sensing) at around $125,000, it reputedly has the Force with it.

• DEPT. OF EXPLICATION AND AMPLIFICATION. In the first sentence of the last issue (January 31, 1986), we did not actually mean to imply that IBM is not a major vendor; what we should have said is that prior to Digital's recent announcement only IBM had offered one-year warranties on medium-scale systems. The significance is that there is one more area where Digital and IBM are acting more alike because they are competing against each other more directly.

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EDP industry report

"The Gray Sheet"

● THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

D.C.BELLOMY, ASSOC.ED. JAN. 31, 1986 ● VOL.21, NO.19 P.J.MCGOVERN, PUBLISHER

SECOND-GENERATION VAX SYSTEMS AND NEW HIGH-END NUMBER-CRUNCHER OFFER A ONE-YEAR WARRANTY THAT DIGITAL IS STILL ON A ROLL

For the first time, a major vendor has offered a one-year onsite warranty (instead of the typical 90-day guarantee) for new computers above the PC level. Digital accounts for its innovation by pointing to the extensive simulation tests that new systems now undergo, plus the increased reliability that accrues from dramatically decreasing the number of boards. Both the warranty and its rationale point to one meaning of the three new VAX systems announced on January 29: Digital intends to maintain last year's momentum through 1986.

It's nice these days to be pleasantly surprised by product announcements. Digital's unveiling of the 8650 was hardly high drama, while its graphics VAXStation II was obviously playing catch-up; IBM's presentation of its new RISC-based workstation was shadowed by the underwhelmed reaction to its S/36 upgrades and the nonadvent of a laptop (see story inside). When word of a second Digital announcement in January first circulated, some speculated about MicroVAX III, possibly in a multiprocessor configuration. The news was better:

- A second generation of VAX, adumbrated in the numbering of the 8600 and 8650, became reality with the announcement of the 8200, which will replace the eight-year-old 11/780 as the VAX benchmark.

- The 8800, a tightly coupled dual-CPU system capable of parallel processing, is supposedly capable of up to 12 times the performance of a 780/8200 and would thus recapture from Data General the MIPS trophy for highest performance by a traditional supermini vendor.

- The multiprocessing capability evidenced by the 8800 is also on display in the 8300, which yokes two 8200 processors together for computer-intensive applications.

- Particularly in the 8200 and 8300, the performance dividends come less from the CPU than the enhanced data transmission rate permitted by VAXBI, the new bus interconnect that supersedes Unibus.

- Decisions to license VAXBI rather than retain Unibus's open house approach, and to initiate a software rental option, nudge Digital towards the marketing and financial style associated with IBM.

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8200. For several years competitors have hammered away at the perceived inadequacies of Digital's midrange 750/780/785 group in price/performance and space/power consumption. Digital averted any loss in market share by its strengths in software and networking, plus the recent success of MicroVAX II and the 8600 systems that bookend the original VAX line. Nevertheless, Digital's Mutt and Jeff have also begun to accelerate the erosion of the older models' market. Shipments of 750s in 1985 were half of what they were in 1984, due largely to MicroVAX II price/performance. It was time for Digital to move.

The 8200 offers the same performance as the 780 for the same number of users, but costs only half as much ($79,000 with 4MB of main memory, compared to $158,000 for a 780 with with the same memory). Three different configured systems are immediately available at prices ranging from $127,000 to $154,000. The 8200 should therefore supplant both the 780 and the 750 (a 750 with 4MB of memory would go for 80% of the 8200 asking price for 65% of the performance).

Moreover, the basic 8200 takes up only a third the space of a 780. The 22" X 42" X 30" processor cabinet requires a little over 4.5 sq.ft. of floor space, while a 780 sprawls over 15 sq.ft. If OEMs and government users prefer, the 8200 can be rackmounted to ship even more tautly. The compact packaging is permitted by the reduction of the CPU from 24 bulky modules to one smaller module. The CPU board is based on eight Digital-developed proprietary VLSI chips with a total of 1.3 million transistors.

The only hitch in Digital's packaging claims is that the nonracked user will require three 22" X 42" X 30" cabinets. Besides the processor housing, one cabinet will be needed for disk and tapes, and the other for a Unibus adaptor and controllers. The Unibus adaptor will be standard for all VAXBI systems, since the installed base of VAX peripherals can only communicate over Unibus, and the new systems must connect to Ethernet through Unibus.

By positioning the 8200 for departmental users who will run commercial applications as well as technical VAX programs, Digital has every reason to anticipate that the new system will reinvigorate the midrange VAX market for OEMs and end users by offering a much better fit with the MicroVAX II. The 8200 offers the same minimal gain in performance and major extension in functionality over the supermicro that the 780 does, without the staggering leap in price.

8300. Digital seems finally to have learned the art of dual-CPU multiprocessing. The 8300 tightly couples two 8200 processor modules within the 8200 cabinet, for 1.6-1.9 times the performance of the uniprocessor model. VMS Release 4.3 has been modified for the 8300 to support a second processor and some parallel processing. In addition, main memory can be expanded up to 14MB, and the 8KB of cache on each processor is viewed as more critical for the 8300 than for the 8200 due to the applications towards which the former is geared.

The 8300 is roughly equivalent in performance to the 785, but Digital is not yet ready to abandon the older model. DEChands in one breath bill the 8300 as a natural upgrade for the 8200, and in the next differentiate the two by describing the 8300 as best suited for compute-intensive applications like CAD and simulation. At least for now a 785 would be marketed to the user requiring more than one MIPS for general purpose applications. An upgrade from an 8200 to an 8300 would be typically recommended when compute-intensive applications consume a significant proportion of processor time; a VAXCluster would then allow the distribution of office applications and the like to 8200s or 785s.

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DIGITAL'S ANNUAL SHIPMENTS OF VAX SYSTEMS (INCLUDING MICROVAX II) AND 780 PERFORMANCE EQUIVALENTS*, 1980-1985
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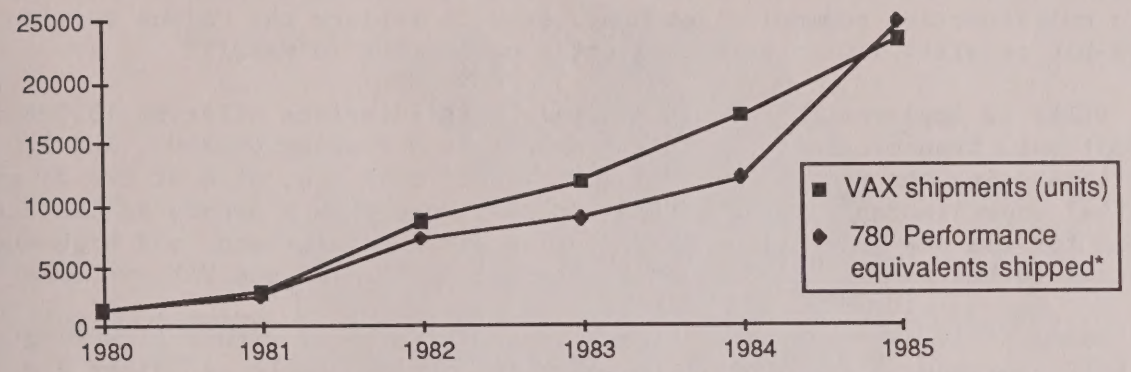

*780 performance equivalents shipped equal VAX shipments times Digital-supplied performance ratios relative to the 11/780.

An 8300 with 12MB of main memory goes for a basic price of $122,000, compared to around $229,000 for a 785 with equivalent memory. Complete 8300 systems will cost between $160,000 and $190,000, and will ship in 60-90 days.

8800. Digital's new king of the hill in raw number-crunching is the 8800, whose claimed speed is up to 12 times a 780 or 8200's in compute-intensive applications. The 8800 is a sleek (45ns cycle time) dual-processor rendering of a new CPU. Within the two processors are 28 custom ECL chips and 186 ECL gate array patterns, designed and manufactured by Digital. Throughput is also accelerated by multiple VAXBIs functioning as a 30MB/second I/O subsystem. Each processor carries 64KB of cache, while both share 32MB of main memory.

Digital seems to feel that the parallelism possible in dual-processor systems makes them uniquely relevant for technical applications. It anticipates heaviest use of the 8800 in such applications as finite element analysis, design rule checking, and design evaluation through simulation. Some code, though, has to be rewritten to make effective use of parallelism. Digital's 8800 crew helped optimize Spice for the new system (a recomposition of less than 10% of the code yielded a program running over 9 times as fast as on a 780), and will help third-party vendors make similar software modifications. ECAD has already announced a parallel version of DRACULA for the 8800.

There is no uniprocessor version of the 8800, if only to avoid performance overlap with the 8650, which will be sold as the most powerful general purpose VAX computer. Digital envisions a typical implementation as placing one or more 8800s on a VAXCluster along with less specialized VAX systems; the cluster can automatically offload the most compute-intensive work to the 8800s.

Supposedly because it is designed for distributed processing, the 8800 will come in only one basic configuration for $650,000 when it ships in 60-90 days. It takes up no more room than a 780, as Digital has developed a 22-layer board for compact packaging. This represents an improvement for a company that in the past has lagged behind some of its rivals in packaging.

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VAXBI. The three new systems depend on VAX Bus Interconnect (VAXBI), which replaces Unibus as the system and/or I/O bus and will expand to encompass a number of other functions now handled by Unibus, plus others unique to VAXBI. A VAXBI KDB50 disk controller has already been introduced, along with promises of a multifunction communication board soon to replace the Unibus version and a 32-bit parallel I/O interface directly connecting to VAXBI.

VAXBI is implemented through a single chip interface offering 13.3MB/second 32-bit data transmission. The VAXBI module is a concise 9" X 9", and I/O controllers using the new bus will typically need only one, at most two BI cards. Digital understandably expects VAXBI to last more than a decade as the "cornerstone for the new generation VAX computing strategy" for mid- and high-end systems (Q-bus remains the low-cost alternative for low-end VAX systems).

Hence it is extremely significant that Digital will retain licensing rights to VAXBI instead of allowing it to enter the public domain as Unibus did. It will license VAXBI technology only to "complementary," presumably noncompetitive vendors. The 13 licenses announced on January 29 suggest what Digital means by complementary: among the products with VAXBI will be array processors from CSPI (keyed to MAP), Floating Point Systems, Numerix, and Sky.

Digital justifies its move to licensing as necessary to protect its investment; Ken Olsen said he didn't want some techies in a garage playing around with the sophisticated technology in VAXBI. Still, the new strategy smacks of the anticompetitive attitude that IBM has had to forswear, at least in public.

Software Rental. Even closer to IBM's usual marketing practices is the decision to offer a rental option for software on the new systems, to include the operating system, languages, and DBMS programs, as well as VAX application offerings. After paying a "small" entrance fee, the user receives a license to pay monthly rent on the software with a 90-day cancellation option.

Digital claims that the new program was created in response to user demand for greater flexibility to try out new programs or change packages. It is true that, with the hefty price tags on sophisticated technical software, users may often find the option cost-effective. But it surely did not escape attention at Digital that a rent option can also benefit the company by allowing better comparisons with IBM software and by imitating IBM's practice of tempering financial fluctuations during hardware cycles with steady rental income.

The Olsen Perspective. Ken Olsen bridled when he was asked whether the new bus licensing and software rental policies meant that Digital was aping IBM's approach. We're in business, he sternly intoned, to be different than IBM. But there is something to be said for melding Digital technology, its software and networking as well as its new hardware, with IBM marketing techniques.

Olsen's contribution, as he reminded the announcement audience, has been to craft an overall strategy within which Digital technology has had to develop. Less than two weeks after William Norris stepped down at CDC, and a day after the shuttle tragedy, his remarks kept returning to the day when he would no longer be directing Digital's future. The model he chose for himself was Moses, who laid down commandments by which his people were directed to live throughout eternity. The announcements that followed his remarks, though, were the latest of a series of recent indices that in at least one respect the analogy was inappropriate: Olsen, unlike Moses, may yet see the Promised Land.

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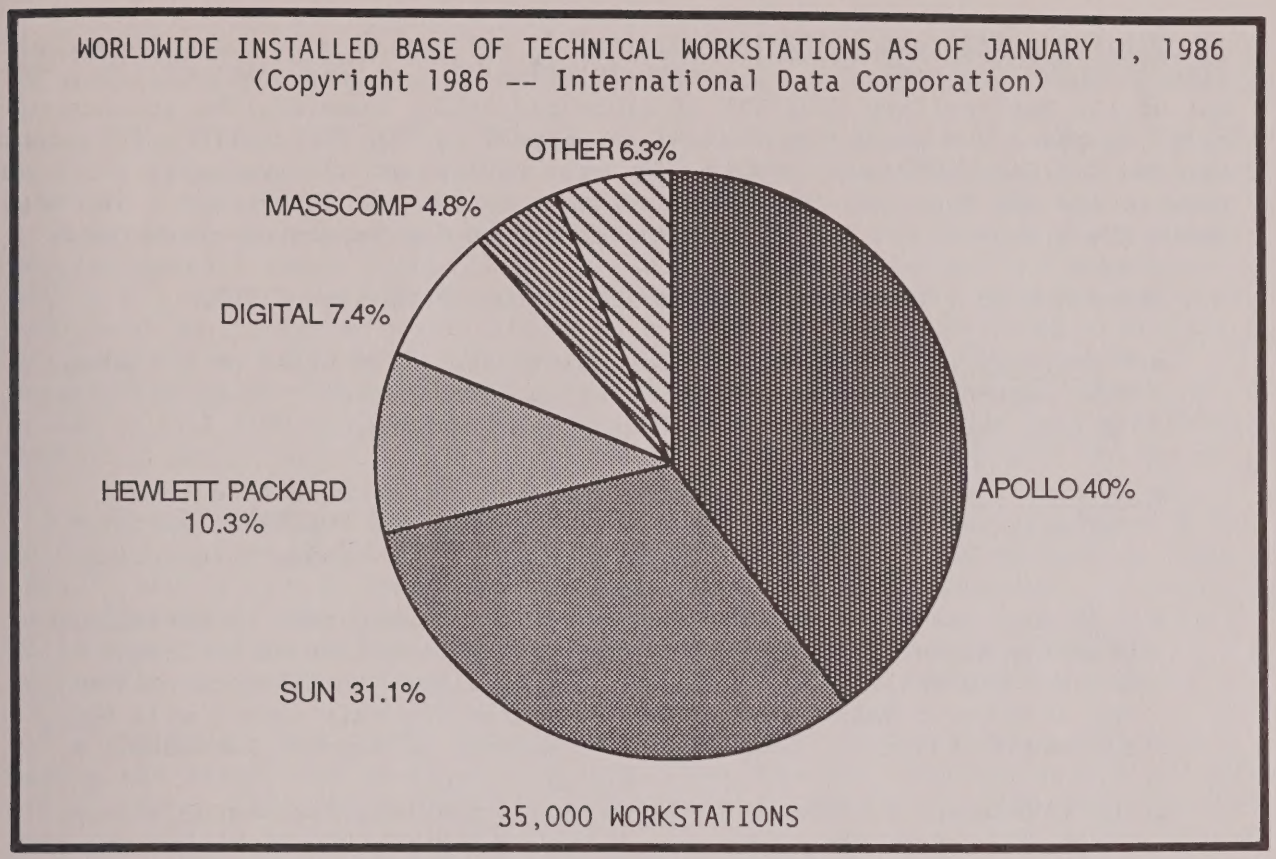

DIGITAL, IBM ADD TO UNIX POTENCY IN TECHNICAL COMPUTING WITH NEW WORKSTATIONS

With their January announcements of technical workstations, Digital and IBM not only focused attention on the growing market for high-performance standalone systems for engineering and other technical applications, but also acknowledged that by their tardiness in entering the market they had ceded the establishment of de facto standards to others. Never before had Digital introduced Ultrix, its Unix variant, on a VAX system before making VMS available (e.g., Ultrix will be an option for the new 8200, 8300, and 8800s, but no date has been set for its availability). Never before had IBM made Unix the standard operating system on a major product rather than admitting it as a barely tolerated guest.

Digital and IBM's coerced support of Unix should have tempered some of the press rhetoric that suggested that they were legitimating the technical workstation market. With 35,000 workstations installed worldwide and PC CAD a growing phenomenon, the market for standalone technical computing was already vibrant even without the full commitment of the industry's leading vendors.

By 1985 there were only two realistic workstation alternatives: Apollo's, and everybody else's (i.e., Unix). And Apollo's proprietary distributed operating system, which has accounted for its lead in the technical workstation market since virtually creating it half a decade ago, is showing the strain of competing with Unix portability. Third-party software vendors have zeroed in on the Unix market, with dire results for non-Unix Computervision.

Nevertheless, Digital and IBM's belated entries are not trivial events. Both are worthy competitors, and should contribute significantly to what IDC expects will be a near-doubling of technical workstation shipments in 1986 over 1985. IBM's RISC-based system also raises issues extending into other markets.

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Digital's VAXStation II/GPX. Digital is not per se a newcomer to workstations. There was VAXStation I, and VAXStation II has been available as a variant of the best-selling MicroVAX II since mid-1985. However, the absence of color graphics and windowing limited the appeal of its workstations for sophisticated CAD/CAE/CAM users, who if they went Digital at all typically purchased turnkey systems from DEC OEMs like Applicon, Calma, and Intergraph. The most immediate effect of Digital's new product may be its impact on these OEMs.

There are four technological gambits in the VAXStation II/GPX:

- A graphics subsystem offers good color capability based on a custom VLSI coprocessor chip capable of up to 560Mb/second. There are options for either four- or eight-plane graphics.

- Ultrix-32w, available on systems shipping in March, offers the advantages of Unix, as well as a new optimized VAX FORTRAN compiler, access to VMS programs via DECnet, -- and the X-Window interface.

- X-Window, developed at MIT, allows network-transparent windowing and graphics access; thus number-crunching can be offloaded to larger VAX systems while other tasks are run locally. Its absence on the VMS version of VAXStation II/GPX scheduled for this summer will be a serious drawback. Look for other vendors to support X-Window.

- The VAXStation II/GPX will support Sun's NFS (see last issue).

There are three color models (a fourth has color capability but a mono display) ranging from $35,000 to $53,000. Thus Digital will be competitive with Apollo in both price and performance.

IBM RT PC. There are two innovations (for IBM anyhow) in the new RT. First, it's Unix, even if the corporate bile still rises at the term and, like Digital, IBM insists on calling the operating system something else (in this case AIX, for Advanced Interactive Executive). And second, it's RISC-based.

IBM first built a Reduced Instruction Set Computer prototype as early as 1980, but the 801 minicomputer was never marketed. The 801 chip did wend its way into the 3090's I/O subsystem, but IBM planners were supposedly unconvinced that RISC technology offered a meaningful payoff in general-purpose computing. For repetitious technical instructions, however, they have developed a new proprietary 32-bit chip that by utopian standards is low-RISC (only 84 of 118 instructions can be executed in a single 170ns cycle). No one, though, has yet achieved 100% single-cyclism, nor is it self-evident that they should seek to.

Together with a microprocessor implementation of "pipelining" instructions, the eponymous RISC technology, IBM claims, allows the RT to run at about twice an AT's performance in compute-intensive applications (circa 1.5 MIPS). And if you happen to need a trillion bytes of memory at a workstation, a new memory management chip's virtual memory augments addressability to that degree.

These gains should be weighed against two debits in the RT's technology. First, although the internal bus is 32-bit, the I/O bus is the 16-bit AT bus to accommodate the PC peripheral base. Second, there is as yet no meaningful networking capability. IBM is between a rock and a hard place: it snubs Ethernet and such, but technical types could care less about token rings.

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• S/36 STALLS FOR TIME. The speculation about the possible use of the RT in office environments was fed as much as anything else by the perceived inadequacies of the S/36. On the same day as the RT announcement IBM made a few S/36 moves that on balance will ease very few of the criticisms. Main memory was increased a notch (256KB, to 2MB), disk storage potential was augmented with a new 358MB drive (supplanting 200MB as the weightiest drive on the system), and the number of workstations supported was supposedly increased by a new controller. The issue, though, has not been the controller, but the capacity of S/36 processors to support effectively the advertised number of users. Until IBM unwraps the beefier S/36 systems that it has been promising concerned users, which may not be until next year, that issue will not go away.

• NO IBM LAPTOP. Choose one, or any combination, or none: A) The IRS snookered the press and will award the laptop contract to someone other than IBM; B) The IRS is so embroiled in hardware and software disputes from past contracts that it decided to sit on the laptop, at least for now; C) IBM is still chary about the commercial viability of any and all laptops at the current level of technology. EDP/IR likes B and C, but isn't taking bets.

• APOLLO AND SUN STATUS REPORTS. The accent in Apollo's financial report was on the 36.9% rise in revenue in 1985 over 1984 and the company's profitable 4th quarter. Understandably, less emphasized were the facts that the revenue rise was all in the first half of 1985 (4Q revenue was down 6.8%, after a 3.7% dip in the previous quarter); that the quarterly profit was only $732,000, down 91.2% from 4Q1984; that net income for the year showed a loss of $1.5 million; or that income before taxes for the quarter registered a loss of $868,000 for the quarter, and for the year a loss of $13.5 million. To recoup lost ground Thomas Vanderslice, Apollo's president, CEO, and chairman of the board, has appointed Roland Pampel, late of the AT&T computer systems group, as a marketing and technology czar (in effect COO) over the VPs nominally charged with those responsibilities. Meanwhile Sun basks in the glow of its recent success. It has registered with the SEC an initial public offering of 4 million shares of common stock, and scheduled for Uniforum in early February a demonstration of its Network File System on four operating systems, including a MS-DOS implementation developed by Sun by which IBM PCs could run as NFS clients.

• PRIME PUMPS. Prime has introduced two low-end office-installable systems to add to the 2655: the 2350 supplants the 2250 (same cost for 80% more power and twice the memory in half the space), while the 2450 offers the 2655 processor with less functionality. The technology is not earth-shattering (there's no Prime-on-a-chip), but the price/performance and software offered by Prime have been finding takers: 1985 revenue was up almost 20% over 1984.

• H-P, IBM COMMUNICATIONS LINKS. Hewlett-Packard has announced a software two-way conversion program between its word processing formats and DCA formats from IBM, and promised a number of ties to DISOSS, starting with a DISOSS Library search-and/or-destroy program due in the second half of 1986.

• SCULLEY'S CORONATION. John Sculley's fellow directors at Apple have now anointed him Steve Jobs' successor as chairman of the board, in addition to his titles of president and CEO. Hail to thee, Thane of Glamis and Thane of Cawdor, thou shalt be king hereafter.

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Overall the RT has the technology to compete head-to-head with Apollo, Sun, and the graphics workstations from DG and Digital. But IBM doesn't seem really to want to. Three graphics display terminals were announced in tandem with the RT, but only one offers color -- low-resolution, limited-palette color at that. For high-end graphics, the user must combine one of the three pricier floor-standing RT models (the desktop won't do it) with a 5085 graphics processor. The RT price is competitive, but for sophisticated CAD work, the RT/5085 combo starts at $39,000 without extra memory, storage, or applications software.

For the next half year or so the quantity of CAD/CAM applications will be fairly meager. Unlike other applications, where a slew of Unix programs are being ported with comparative ease to AIX, IBM is treading carefully to avoid erosion of the mainframe-oriented solutions that have made it the revenue leader in CAD/CAE/CAM (24% of the 1985 market). One clue to its strategy is an RT CADAM program, available in the third quarter, that will be compatible with the mainframe version; a user can switch back and forth on a 5080 between RT and mainframe CADAM depending on performance requirements.

The CAD/CAM scenario is a reminder that IBM likes to exploit niches with software and auxiliary hardware like the 5080, not with new processor systems. This is certainly a factor in IBM's tardy entry into the technical workstation market, just as it was for the delay in recognizing a need for fault-tolerance, just as it may have been in the nonannouncement of a laptop PC.

One need look no further for a explanation for the broad marketing target cited by IBM for the RT: not just current workstation users, but "more than 3 million technical professionals in the U.S." who need to manipulate and analyze data. The RISC architecture would allow them to crunch more numbers and digest them more quickly than the AT, while an optional coprocessor would allow them to run standard AT commercial packages at speeds rated at between an XT and AT.

It is not clear how committed IBM is to its own rhetoric, or how effective it will be in reaching technical professionals (hardly the bluest of computer users). Given the uncertainties about the RT's announced target, some wonder if IBM is mulling over, or may be forced to consider, another and even larger market for the RT: as a better price/performance alternative to S/36 in small departmental computing. The view in this corner is that while a desperate sales rep here or there might be tempted to throw the RT against a small AT&T 3B, DG CEO, or Digital All-in-1 competitor, IBM's marketing strategists would get apoplectic when they found out about it. They are well aware of the AT performance cap and the problems with S/36, but are also aware that AT&T's best shot at becoming competitive with IBM is if Unix can finally begin to penetrate commercial processing. AIX is enhanced Unix, but still Unix.

This is not to deny that the RT has implications beyond the technical workstation market. A variant of the RISC chip may appear elsewhere, though probably not in more commercial systems. The RT keyboard is IBM's friendliest yet. And then there's Virtual Resource Manager, called by IDC the "Hypervisor."

The RT's VRM is the median between the proprietary chip architecture and the open operating system. It is also VRM that allows smooth coprocessing between RISC and the AT emulation chip. Intriguingly, VRM could perform the same oversight over different processors and operating systems across IBM's PC and small-scale systems lines, especially now that S/36 and S/1 are on single boards and 370 architecture has been reduced to two in the AT/370.

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"The Gray Sheet"

D.C.BELLOMY, ASSOC.ED. JAN. 21, 1986 ● VOL.21, NO.18 P.J.MCGOVERN, PUBLISHER

THE PILOT ASHORE: NORRIS LEAVES HELM AT CONTROL DATA

The Grand Old Man of the industry has decided to accept emeritus status. After almost three decades of running the company he founded, William C. Norris relinquished the positions of chairman and CEO of Control Data at a board meeting on January 10. Both titles passed to Norris's chosen successor, Robert M. Price, who also (for now at least) retains his position as president of the company. Norris will remain a director, but will no longer be sending plays from the bench as CDC tries to rebound from the worst year in company history.

If Steve Jobs had stayed at Apple as long as Norris set CDC's course, it would be 2006 before he stepped aside for the Pepsi Generation. In 1957 Norris resigned as vice president and general manager at Univac when he identified a market for high-speed scientific computers that his company was ignoring and IBM, he felt, was shortchanging. For his venture Norris tapped Seymour Cray, who provided the technical expertise to build Eisenhower-era supercomputers. From that base grew a goliath with annual revenues now in the $5 billion range.

Norris fit the image of solitary pioneer better than most. An iconoclastic individualist, he lives like a pioneer in his wind-powered, solar-heated Minnesota home, and he talks and acts the same way. In the 1960s he took IBM to court, and won an impressive settlement. In the 1970s he instigated a wide-ranging series of social activist programs. In the 1980s he raised the issue of technology transfer to foreign competitors by U.S.-trained engineers.

Norris's penchant for matching actions to his words has provided ammunition to critics who like to blame much of CDC's current travail on his visionary projects. They point to the $1 billion invested in Plato, a computer-based education program, and the $100 million or so sunk into social programs like setting up assembly plants in ghettos and prisons. In August the SEC forced CDC to restate 4Q1984 and 2Q1985 results downward by over $35 million, largely due to losses at its Earth Energy Systems, Inc. venture. The image of Norris as a latter-day Don Quixote tilting at windmills seems to some all too apropos.

To these carpers Norris points out that Plato is at last turning a profit as corporations start to use it for retraining, and is being leveraged into other CDC divisions. Even the social programs are designed to make money, however they turn out. The scoffers are often the same ones who claim that the private sector, not the government, should be helping the helpless.

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A more pertinent complaint about Norris's ventures is that they overloaded the corporation's already hyperextended attention span. No other U.S. computer manufacturing corporation has put its fingers into so many different, often highly disparate pies. It would have taken a superb management team to have kept all CDC activities at maximum profitability. Probably the gravest charge against Norris is not his social conscience, but his inability to recruit and retain the quality administrators required to implement his vision.

Most of CDC's principal divisions have been losing market share recently. Increasingly the company has been corralled into narrow niches, some of them cul de sacs. For a corporation as segmented as CDC, it is necessary to look at each of its major activities to estimate its viability under its new leader.

Supercomputers. If Seymour Cray had stayed with Control Data, it is likely that 1985 would have been a banner year for its supercomputer division. Instead the revenue flowed to the eponymous corporation founded by Cray in 1972. Recognizing that state-of-the-art high-speed scientific processors are best developed in small-scale think-tank environments, CDC in 1983 spun off a subsidiary, ETA Systems, to develop a new multiprocessor system that could run up to ten times as fast as the CYBER 205, the only supercomputer in the active CDC repertoire. In January 1985, marketing of the 205 was shifted to ETA, which accounted for only four shipments last year (a quarter of what Cray achieved).

At midyear ETA was swept into its parent corporation's financial maelstrom after CDC's decision to shop around for additional equity investors. It has apparently backtracked after criticism of the move mounted (and no desirable investors appeared on the horizon), but the suspicion lingers that the issue was ETA as much as CDC. ETA still expects to ship its first system at the end of 1986, but the largest windfall when the current installed base of over 30 205s starts shopping for successor supercomputers will likely accrue to Cray.

Other Computers. CDC claims to offer the most extensive performance range of binary compatible computers currently available, with the fastest CYBER 180 running nearly 60 times faster than the entry-level system.

This sweep only became available over the past few years, as CDC began to add medium-scale systems to attract new customers away from Digital, DG, Prime, etc. Its first CYBER 170 superminis were introduced in April 1982. Two years later it added the first of two supermini CYBER 180s, the 810 and 830, and promises smaller, higher-performance medium-scale systems for 1986. The supermini systems have been registering good growth, albeit from a small base.

The heart of the Control Data line nevertheless remains its large-scale systems, now headlined by four CYBER 180 offerings. The high-end 990 began to ship in the second half of 1985 (the dual-processor version, none of which have yet been shipped, is the system rated by CDC at 58.1 X the performance of an 810). Early last year three less potent 180s were unveiled -- the 840 (which IDC ranks as a medium-scale system, but CDC as a mainframe), 850, and 860.

CDC marketers stress the versatility of 8XX 180s at both commercial and scientific, scalar and vector processing. A dual-state architecture allows them to run either 170 or 180 instructions. In its 170 state the CPU uses the Network Operating System, employs 24 registers, and operates with 6-bit character/60-bit words. In its 180 state the equivalents are the Network Operating System/Virtual Environment, 32 registers, and 8-bit characters/64-bit words.

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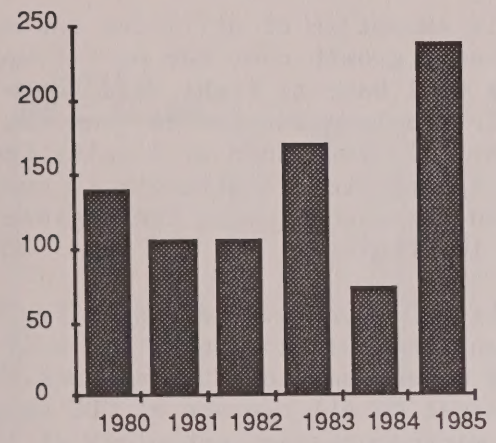
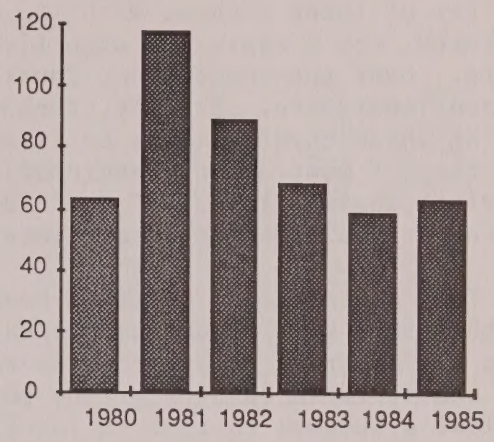
CONTROL DATA COMPUTER SYSTEM SHIPMENTS, 1980-1985*

LARGE-SCALE SYSTEMS



MEDIUM-SCALE SYSTEMS



*1985 shipments grew in the low end of each CDC system class and should not be construed as representing proportional gains in shipment value.

In the U.S. at least, Control Data computers are still overwhelmingly associated with scientific/engineering applications. The mix is more even elsewhere (CDC claims representation in 20 French banks, with nary a Fortran compiler in sight). But for the foreseeable future most revenue will come from what CDC euphemistically calls its "focused market" -- i.e., niches for which it has developed, or sees prospects for, its hardware and software solutions:

- Utilities. One of the few areas where CDC claims market leadership is in dedicated utilities systems (even if in utility MIS shops it lags far behind IBM and Digital). Sales in 1985 marked what a spokesperson says "may be our best year yet" in the sector. The company cites 23 energy management systems installed or on order, almost a third of them from contracts signed since November 1, 1984.

- Petroleum. CDC has a firm foothold in this market, which unfortunately is in as bad a shape as it is. It did sell five 180 systems to China's Ministry of Petroleum in 1985.

- Government systems, particularly for defense research. CDC claims that this market group generated $300 million in 1985 and has been growing at 12-14% p.a. Future growth, though, depends less on the will of Control Data than on the ways of Washington.

- Higher Education. CDC software offerings, including Plato courses, have been making inroads beyond traditional E-school sales.

- CIM. Like everyone else, CDC hopes to get a large piece of the CIM pie whenever it comes out of the oven. Its major product is Integrated Computer-Aided Engineering and Manufacturing (ICEM), which includes the configuration manager shown at Autofact in November.

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To address the needs of these "focused markets," in November CDC combined its mainline computer systems group with computer and consulting services into a Scientific/Engineering Systems and Services division. The distinction between niche marketing and custom sales was no longer worth maintaining.

Few of these niches, with the possible exception of utilities and defense research, could represent significant revenue growth over the next couple of years. Over the longer run, Control Data will have to fight hard to retain its current customers. Frankly, technology is accelerating faster than CDC is reacting these days. It has built up an enviable reservoir of loyalty from users who respect Control Data engineering and appreciate its strength in customer service; nevertheless, CDC can't depend on its cachet among the engineering fraternity to continue to generate sales indefinitely.

Thus the critical question confronting CDC's computer division for the rest of the 1980s will be whether it can prevent serious erosion of its user base. Some will migrate to supercomputers, more often than not Cray systems. Minisuper and multiprocessor startups pose a threat to all classes of CDC computers. Digital's success in 1985 in integrating microprocessor technology at the small-scale side and reinvigorating the top of its VAX line does not bode well for CDC's supermini offerings. And last but definitely not least, IBM, after conceding the mainframe scientific/engineering market for over two decades, has signalled with the 3090 that it will be competing for sales with CDC.

Storage. The plummeting revenue and pretax profitability of CDC's peripheral products group are primarily responsible for the company's bad showing in the information services and products part of its recent quarterly reports. Once upon a time storage products were a cash cow, but recently the low end has been going on a strict sushi diet, while the mainframe menu is written by IBM. Even CDC's drawn-out loan crisis is in large part attributable to disk-drive problems, since many of the short-term loans at issue were originally taken to cover 1984 write-downs after Control Data aborted its 3380-class project.

While CDC once dominated the U.S. storage market, the only areas where it still leads the pack are dying or highly perishable segments (e.g., 14" medium-capacity drives and disk packs). Too often lately it has either lagged in marketing (as it did with 5.25" hard disks and its PC subsystem products) or stumbled technologically (witness the thin-film 3380 failure and the "Cricket" 3.5" drive). As the downsized group gropes for direction, it is still fumbling new products, like the 14" disk removed from the market after a matter of months.

Nevertheless, there is a niche for CDC tape and drive products at the upper end of mid-range storage. Its 9" drives will compete not only with Japanese entries from NEC and Fujitsu, but also with 8" and 5.25" products from Priam, Maxtor, and other U.S. manufacturers. Still, this is a market where CDC has the technology, the potential growth, and the reputation to maintain its position as a strong player, even if leadership may now be beyond its grasp.

Computer Services. Turbulence was probably to be expected in this sector of CDC's activities, as it tried to deal with the demise of the traditional timesharing market. It didn't have to be this turbulent, though. As things now stand, the group is a mixture of money sinks and fountains. Some attempted alternatives, like the centers to provide small businesses with computer assistance, have been fiascos. However, CDC is now competing in that same market with some success against GEISCO and ADP with payroll and accounting services.

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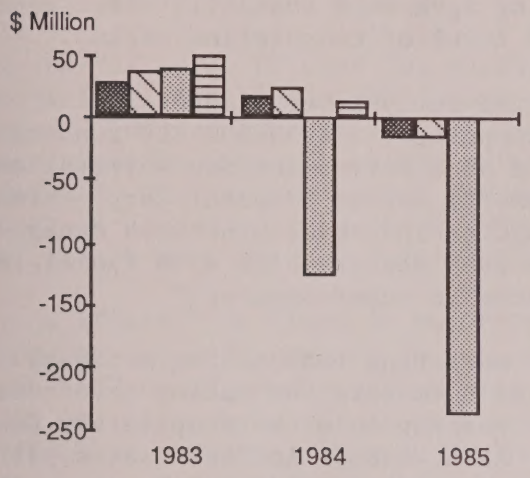
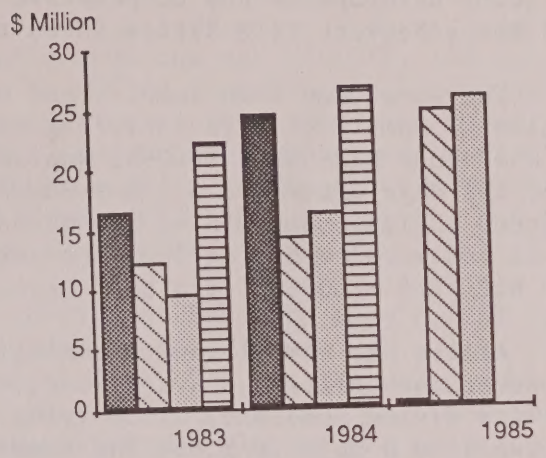
CONTROL DATA QUARTERLY FINANCIAL RESULTS ($MILLION), 1Q1983-3Q1985

PRETAX EARNINGS, INFORMATION SERVICES AND PRODUCTS



PRETAX EARNINGS, FINANCIAL SERVICES



Commercial Services. The gems here are the Arbitron Ratings Company and Ticketron. Ticketron is the one ticketed for sale, which is one of the more adroit moves CDC has made during the crisis: it is profitable and should bring in a nine-digit figure, but would have faced an uncertain future at CDC.

Commercial Credit. One of CDC's less adroit moves was the on-again, off-again sale of its financial service arm. In 1983 CDC decided that it should stick to what it knew best, which it felt was not loans (commercial and personal), leasing, and insurance. Ironically, what changed minds at CDC about Commercial Credit was the corporation's own credit crunch in 1985: true, Commercial Credit profitability did not stack up well against some of its competitors in financial services, probably due largely to CDC mismanagement, but compared to the rest of CDC the financial services segment (mostly Commercial Credit) was fiscally fit. The only really weak period was 1Q1985, while CDC was known to be seeking suitors for the unit. It was taken off the market in June.

What CDC is doing instead is repositioning the unit for higher returns. Less profitable parts are being pruned, some of the most profitable are being evaluated for possible sale at the right price, and potentially profitable areas are being reorganized (for example, a number of consumer finance operations have been sold off to create a smaller but more viable regional company).

Summary. The piecemeal reassessment of Commercial Credit replicates what CDC is doing throughout the corporation. However, the individuals making these decisions are still by and large the same ones managing CDC as it careened towards the crisis. There has been a tendency to blame everything on William Norris, which is the kind of individual accountability that he welcomed. But Price has long had considerable leeway in selecting managers, among whom the responsibility for success or failure must now be shared. That is the advantage and disadvantage of moving out from under the shadow of a giant.

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SUNUPMANSHIP: SUN'S OPEN STRATEGY STARTING TO PAY DIVIDENDS

Now the winter of Apollo's discontent has been made more inglorious by the rise of Sun. A little less than two months after Apollo signed up Alliant's parallel processing systems as central compute servers, Sun and Alliant have signed a joint development and cooperative marketing agreement that will offer users of Sun's Network File System (NFS) the same level of computation backup.

The same, and then some. Last October the entry-level product in the Culler 7 family of scientific/engineering computers, a $250,000 CPU running at 7 Whetstone MIPS or 2 MFLOPS, was introduced as a server for Sun workstations. And two days after the Alliant-Sun announcement, Convex Computer Corp. formally agreed to implement NFS on its minisupercomputer and develop network management software combining Sun interactive services and graphics with the claimed 60 MIPS/2.9 MFLOPS of its self-styled "affordable supercomputer."

Apollo has compelling technological and marketing reasons for monogamy. However much Alliant plays around, Apollo can't emulate the mating practices of its divine namesake, since tying another company into the proprietary Domain network is a major engineering commitment. Also, one of Apollo's sales pitches is that it offers complete solutions for the befuddled CAD/CAE/CAM user. The choice of a single high-end processor partner fits Apollo's corporate image.

One danger is that many users, even befuddled ones, actually like variety. Culler, Alliant, and Convex represent different levels of and approaches to high-performance scientific computing. Moreover, the new technologies are still largely untried. Apollo has cast a significant vote of confidence for parallel processing and Alliant, but there are many more ballots to be counted.

Sun can afford to experiment with different vendors and approaches, and start-ups can arrange links with relative ease, because of the decision to make NFS an open system. When it was announced in November 1984, Sun promised to publish protocol specifications and license the technology to one and all. Sun is positioning NFS as a multivendor standard for all technical applications.

NFS is a client-server network communicating over Ethernet (though other LAN technologies are not excluded). Any system in Sun's implementation of NFS can be client, server, or both simultaneously, except that a server can't act as an intermediary between a client and another server. It is most unlike Domain in that, while Apollo's network is a distributed operating system, Sun constructed NFS around its implementation of Berkeley 4.2 Unix but intentionally excluded Unix file system operations to maintain a "stateless" interface.

The NFS user is promised certain advantages, chief among them file sharing from one server to insure consistency (without file transfers, multiple copies are avoided), storage savings (since far fewer files are necessary, many workstations will not need drives), and transparent multivendor interconnections.

There are also advantages for Sun Microsystems. It can bill itself as the workstation price leader by offering storageless models (a workstation introduced on January 20 set a new price point at $7,900). And the multivendor connectivity is in fact creating a standard. On January 14 Sun scored a coup with word that Digital would implement NFS on its Unix-based engineering workstation. And, for the capping irony, the Apollo-Alliant pact could for the first time allow Sun-Alliant users to poach on Apollo's Domain.

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• XEROX'S PRINTER-BASED OFFICE STRATEGY. Xerox's effort to become a major OA player (it now is training its entire sales force in the basics of office systems and assigning over half to integrated systems sales) is predicated on its printer strength. On January 8 it announced a medium-speed laser printer, an ink-jet color printer for business graphics and low-end CAD/CAM, and an entry-level electronic publishing system. Alongside them came an extension of Xerox's Interpress printing architecture, a universal interface describing page appearance on any raster printer that allows broad workstation/printer linkage. The peripheral and software products explain how Xerox will market XC 22, a second PC network on 1-Mbps twisted-pair Starlan less costly than XC 24, its 10-Mbps network utilizing thin coaxial or standard Ethernet cabling.

• STORAGE TEK GIVES UP ON OPTICAL. Rather than risk more development funds (and the company's chance to get out from under Chapter 11 protection) on its much-ballyhooed, much-delayed high-end optical disk that couldn't ship until 1988 and then might not be able to compete successfully against double-density 3380-class products, Storage Technology has pulled the plug on the project.

• NAS UPGRADES. National Advanced Systems has tweaked performance up 12.5% for three models in its 308X-class AS/80X3 series, and decided after all to offer single-capacity 7380 disk drives field-upgradable to the double-density 3380-class products (when double density was announced last March, NAS had argued that nonupgradability would protect the investment of its user base).

• COMDISCO VS. THE IRS. The computer leasing firm is vigorously contesting the government's proposed assessments of $200 million for 1980-82. At stake is a standard procedure in third-party leasing, the assignment of a lease to a bank which then lends the money back to the leasing company at a standard discount. For tax purposes Comdisco then distributes the rent paid by the lessee, minus interest, over the full life of the lease; the IRS claims that Comdisco should instead count the loan received by the bank during the first year of the lease as income, since the rent is going to the bank, not the lessor. The issue is not total income tax owed over the life of the lease, since under the IRS interpretation Comdisco would not be receiving any income after the first year and could continue to subtract depreciation. However, by distributing the income over the life of the lease Comdisco is now due annual refunds from the IRS, rather than tying up part of its capital during the initial year.

• TOLERANT NOW "FAULT-TOLERANT." Tolerant's Eternity series of loosely coupled units of tightly coupled microprocessors running on a version of Unix offers an expandable system claiming the data integrity necessary for OLTP.

• FUJITSU JACKS UP PRICES. The revaluation of the yen was the only reason cited for U.S. price jumps of 5% for printer products and 8% for storage.

• PC-II FROM HONEYWELL. IBM notwithstanding, Honeywell is offering a pared-down version (10MB hard disk rather than 20, etc.) of its XT competitor.

• NCR SHOOTS PAR. NCR has announced new office interconnect products for WorkSaver clusters, IBM-compatible PCs, and Tower supermicros. NCR's year, like its product announcement, was average for the industry: 1985 revenue was up 6.0%, while pretax income grew only .2% (net income was down 8.0%).

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• DIGITAL, IBM GAINS SPARK DIFFERENT REACTIONS. Wall Street raved about Digital's quarter, as revenue jumped 14.4% and net income vaulted 23.4% over 4Q84. IBM's quarterly income was also up 23.4%, while revenue grew 18.3%. Wall Street thumbs, though, pointed downward. Although the quarter pulled 1985 to 9% revenue growth at just over $50 billion, IBM couldn't eke out a gain in annual earnings. Moreover, the push to boost 1985 results involved borrowing from 1986 Sierra sales and growth rates. Over the longer run, the doubling of revenue necessary to reach IBM's goal of $100 billion by 1990 is not unattainable (a compound annual growth rate of 14.8% would do it), but it will require IBM to outpace IDC's forecast of the probable growth rate of worldwide computer system shipment value by about 15%, a near superhuman velocity without acquisitions by IBM. Its 1985 record suggested what few investors seemed to believe until the latest quarterly hit the wires -- that the Bluesmen are only human.

• APPLE INVERSION. In the final quarter of a year in which profits dwindled and often evaporated for most vendors, even when revenue continued to grow, Apple has reversed field. It was revenue that was down 23.5% from 4Q84, and net income that was up by the same percentage. The secret lay in the "cost and expenses" columns: cost of sales was trimmed 36.8% over 4Q84, and marketing and distribution expenses were 26.7% slimmer. With the company's new emphasis on efficiency, it is even happy with the drop of sales to retailers, as stores were able to sell most of their Christmas stock. This should alleviate first-quarter inventory problems. Moreover, despite the revenue drop from 1984, Apple boasted that 4Q sales reached "the second highest level ever achieved by the company." The comfort and joy were due to the seasonal turnover of Apple IIs, which suggested that, for at least one month a year, the home market will be returning like reruns of "A Christmas Carol."

• APPLE CONVERSION. Demonstrating in two-page spreads in the Wall Street Journal and New York Times its "commmitent" [sic] to the business market, Apple has introduced the Macintosh Plus and the LaserWriter Plus. Faster by 50% than the Macintosh, the Mac Plus will retail for $2,599, only $100 more than what the 512K Mac has been pegged at, which is why the latter's price has been slashed to $1,999; even so, the new model probably dooms its predecessor. Owners of orphaned Lisas and Macintosh XLs will be able to buy Mac Pluses for $1,498 as trade-ins, now that Apple finally has another heavy-duty model. Again, though, there will not be complete compatibility with existing Macintosh software, this time due to the hierarchical file system added to the Mac Plus. The LaserWriter Plus, which with 1.5MB of memory is called by John Sculley "the most powerful computer Apple makes," will cost $799 more than the original printer but should mitigate the one major gripe about it by speeding up production of copy. Still, it's one thing to woo business customers, and another to wow them. In the long run Apple seems to be placing its business bets less on new hardware than on communications interfaces allowing Macs to function as user-friendly intelligent terminals. Sculley's speech noted that Apple itself front-ends Macs to IBM mainframes, networks them with Digital's All-In-One for office work, and connects them with Tandem computers for manufacturing. Apple has also solved a p.r. problem by resolving the suit against Steve Jobs.

• DEPT. OF EXPLICATION AND AMPLIFICATION. In Vol. 21, No. 15 (December 5, 1985), p. 7, the left-hand charts on units shipped in the U.S. CRT-based display market should be in millions, not billions.

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EDP industry report

● THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"The Gray Sheet"

D.C.BELLOMY, ASSOC.ED. DEC. 20, 1985 ● VOL.21, NO.17 P.J.MCGOVERN, PUBLISHER

IDC INTERNATIONAL DATA CORPORATION

GREAT SOFTNESS TOP STORY FOR 1985, AND THE IMMEDIATE FUTURE

Now that the year's at the eve, it is time again for retrospects and prospects. In 1985, though, the retrospective has to take precedence, partly because a few recent events have been especially significant, not to say traumatic, and partly because one of the year's lessons is the difficulty of making forecasts.

We asked the editorial board of EDP/IR and leading analysts in different fields at IDC to list and rank the year's Top Ten stories according to their impact on the computer market in 1985 and/or their long-term significance. Some of the results were intuitively obvious; others were not. With their help, we now present, in order, the official Gray Sheet Top Ten for 1985:

- The Great Softness of 1985
- Digital's MicroVAX II
- IBM's Sierra announcement and shipment of the 3090-200
- U.S.-Japanese chip war
- IBM's Token Ring announcement
- The MAP-TOP demonstration at AUTOFACT
- Multiprocessor and minisuper startups
- AT&T (mostly) unshackled by the FCC
- The erosion of Control Data
- The stuttering of Lotus, Cullinet, and other software leaders

Some of these stories are important as portents of larger trends. However, not all the crucial trends that shaped 1985 and will continue to mold the contours of the computer industry over the next decade are directly related to the top stories. Of these subterranean currents, the most significant are the move towards corporate consolidation, whether through acquisition or merger, and the transition from entrepreneurial to managerial control of major vendors.

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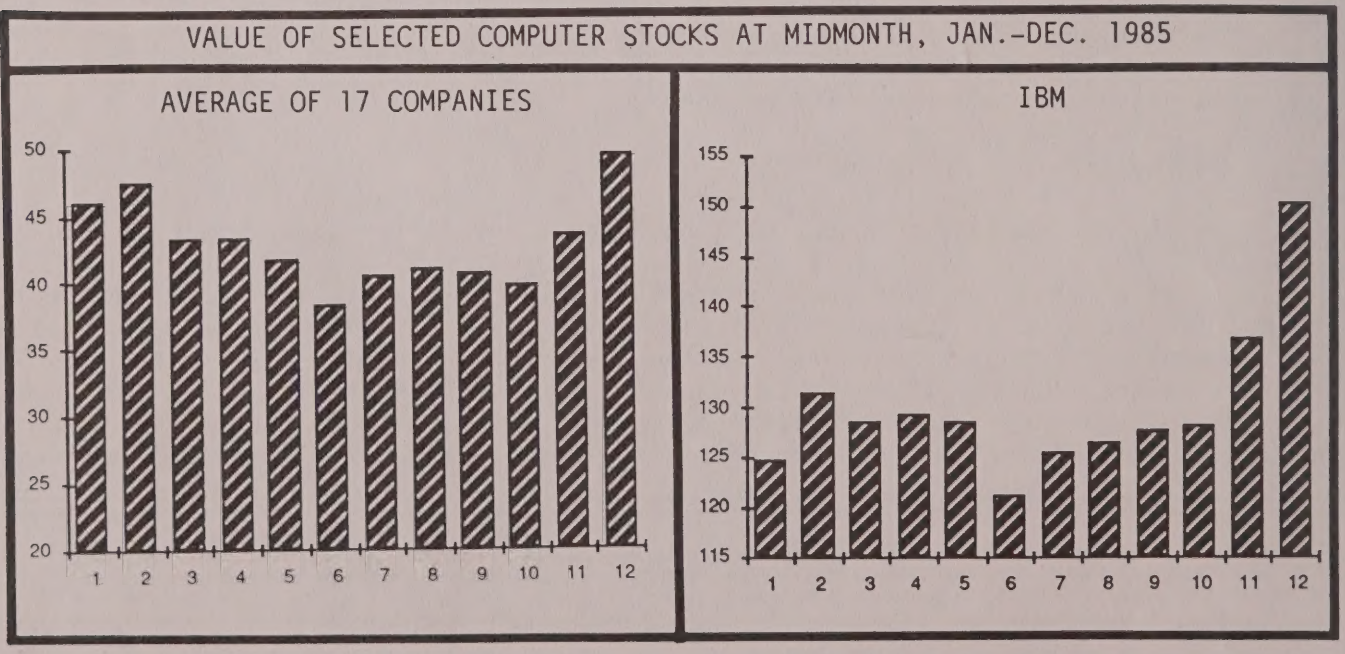
1. The Great Softness of 1985

Wall Street at least believes that the slump is over. After ten months of idling in neutral, computer stocks began to accelerate in November, and over the past few weeks floored the pedal. Granted, this abrupt turnabout occurred in tandem with December's bull market, but high tech stocks have often marched to the beat of a different drummer than the one setting Wall Street's gait. This time, they are both double-timing it to record levels.

IBM, after staying put between $125 and $130 through October, is now over $150. After zigging down from $110 to the low $90s, Digital zagged back up to over $130. The average value of 17 computer stocks (Apollo, Apple, Burroughs, Compaq, Control Data, Convergent Tech, Data General, Digital, Hewlett-Packard, Honeywell, IBM, NCR, Prime, Stratus, Tandem, Texas Instruments, and Wang) shows a far less dramatic reversal of fortune, but is ending the year on a decidedly upbeat note -- up 7.5% from what the average value was in mid-January.

Some day some revisionist historian (the kind who decides that Lincoln was a totalitarian and Caligula got a raw deal) will argue on the basis of stock prices that 1985 was an up year for the computer industry. We know better. The sharp rises in stock prices are more likely just the way investors breathe a sigh of relief at signs that the worst of the downturn may be over.

Fourth-quarter results will probably allow an annual growth of 5% in U.S. computer revenue, but at a heavy cost. Actual bankruptcies have been relatively few (among the failures were Chapter 11s for Atasi and Zaisan, Chapter 7 dissolution for Denelcor, and the subsidiarycide of Shugart and Mostek), but low profits, write-offs, losses, and/or layoffs hit virtually every vendor. Some got stung in the first half of the year (e.g., Apple); others suffered more in the second half (like Apollo); a number have endured a full year of torture (Control Data, Computervision, most storage vendors, to a lesser degree Wang and Data General); most have been battered by low profits even when revenue was expanding. Only a handful of companies like Compaq, Cray, and Stratus have enjoyed the growth that strong vendors could expect in other years.



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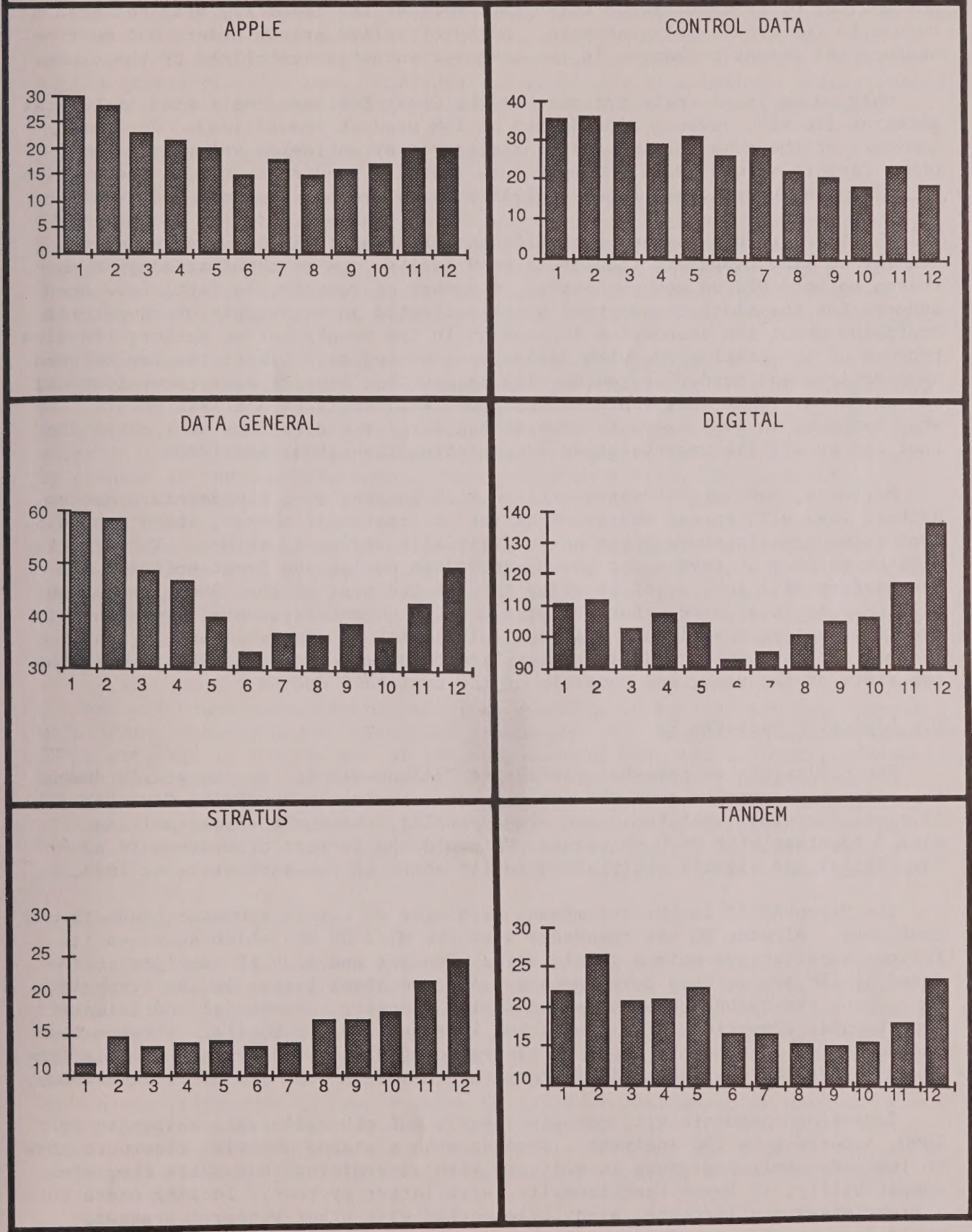
VALUE OF SELECTED COMPUTER STOCKS AT MIDMONTH, JAN.-DEC. 1985



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Unfortunately, the end of the Great Softness, which may take until the second quarter of 1986 to extend throughout most of the industry, will not mean a return to the growth rates of yore. Sighs of relief are in order, but must not obscure the dramatic changes in the computer industry symbolized by the slump.

Only among large-scale systems has the Great Softness replicated historical patterns (to wit, revenue dips during an IBM product transition). For three-quarters of the computer industry (as measured by worldwide shipment value), other factors were at work. Simply put, industry vendors have been the victims of their own success, and faced in 1985 a users' revolt of their own creation.

The industry has reached a significant benchmark: it has succeeded in placing so many computers that users need feel no qualms about seizing on any reason to hold off on new purchases. A number of reasons, in fact, have been adduced for the slack demand that quickly created an oversupply of computers: confusion about the economy; a depression in the manufacturing sector; the slow process of integrating PCs with larger systems and each other; the lag between user desires and vendor responses with regard to effective data communication; and so forth. What they share is that none was really at a crisis point. What happened in 1985 seems to have been a largely unconscious user rebellion that fed on all the uncertainties accumulating throughout the 1980s.

Moreover, none of the issues raised will go away when the downturn abates. Rather, they will spread worldwide as the international market, where many U.S. vendors managed to shore up sales in 1985, also begins to mature. The effects will be neither so severe nor so widespread as during the Great Softness. A few vendors will make a lot of money through the rest of the 1980s, while many will make at least some. But the pressures on computer vendors' profitability over the past year will only slacken in intensity -- they will not go away. Because of its sources and wider significance, then, the Great Softness is the top story of the year, and possibly of the next half decade.

2. Digital's MicroVAX II

The choice of the somewhat mislabeled "VAX-on-a-chip" as the year's number two story may surprise some who are already querulously demanding MicroVAX III. It's not just that what Ken Olsen already calls "the world's best-selling mini," together with 8600 shipments, "stemm'd the torrent of a downward age" for Digital and significantly added to its share of the midmarkets in 1985.

The MicroVAX II is the triumphant harbinger of future computer products and conflicts. Already DG has responded with the MV/2000 DC, which squeezes its Eclipse architecture onto a single chip. The S/1 and S/36 PCs earlier introduced by IBM are related developments. All are shock troops in the struggle to control the richest no-man's-land in the industry, commercial and scientific departmental computing. The two market leaders, IBM and Digital, between them accounted for less than a third of the value of U.S. small-scale shipments (the nexus of departmental computing), compared to 46% of U.S. medium-scale revenue.

Supermicrocomputers will comprise nearly 80% of small-scale shipments by 1990, according to IDC analysts. Vendors with a strong position elsewhere hope to leverage their dominance in software with supermicros that share complete compatibility, if lower functionality, with larger systems. Locking users into a proprietary architecture, even if networked with other vendors' systems, would lead to ever-growing market shares.

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The alternative will be open-architecture supermicros, typically running on Unix. Both will have their attractions, but the MicroVAX II's early success with end users and VARs bodes well for the established supermini vendors' strategy. Caught in the middle will be workstation vendors with proprietary architectures of their own. Apollo is already in a vise between open-architecture Sun and the VAXStation II, based on the MicroVAX II. And IBM awaits.

3. IBM's Sierra announcement and shipment of the 3090-200

It is always a major story when IBM spawns a new generation of mainframes. If it weren't for the slump and the long-term implications of the MicroVAX II, Sierra would have been accorded the number one slot that is normally a new blue top-of-the-line's due. The centrality of mainframes for major users, IBM's dominance of large-scale sales, and the role of mainframes in IBM's overall strategy (not to mention its profit margins) all direct attention to the 3090.

Underscoring Sierra's significance is the New York Times report on December 8 that Morgan Stanley's chief economist is predicting that 3090 shipments will account for at least one percentage point of G.N.P. growth this quarter (almost half of the expected expansion) and about a quarter of a percentage point in 1986. Even if the economic impact of Sierra is partially explained by changes in how Commerce counts computers when totting up the G.N.P., it only goes to show that it's now "what's good for IBM is good for America."

Over the next few years Sierra will be good for IBM. (As for how many years until the next generation, EDP/IR opts for shipment in 1989.) For 1985, though, the drop in 308X sales during the transition flattened IBM's large-scale revenue at a particularly unpropitious time. Sierra will beef up fourth quarter results, but only after contributing, along with slow midscale sales, to IBM's difficulties through the first three-quarters of 1985.

New mainframe announcements offer an opportunity to evaluate and compare major large-scale vendors' plans and prospects. The biggest change apparent in IBM's strategy is the revival of its long-dormant interest in high-performance scientific computing through special instruction sets and circuitry on the 3090, and now a Vector Facility. Among its PCM competitors, the NAS-Hitachi alliance responded quickly, while the Amdahl-Fujitsu combo lagged. In the Bunch, Honeywell will hum along with a NEC machine, while Burroughs will offer the only American-designed and built Sierra-class system other than the 3090.

4. U.S.-Japanese chip war

High-tech trade tensions between Japan and the United States have until recently centered almost entirely on Japanese bars to U.S. exports rather than the threat of Japanese imports. The powers-that-be seem to feel that Japanese domination of the computer peripherals market is comparatively peripheral. Hardware revenues still stay overwhelmingly in the U.S., and for software almost unanimously so. But over the past few months, charges and countercharges have been flying over alleged dumping by Japanese semiconductor manufacturers attempting to control the U.S. market. Three ITC suits are now under way: Micron's over 64K DRAMS; Intel, Advanced Micro Devices, and National Semiconductor's over 256K EpROMS; and the Reagan administration's over 256K DRAMS.

Whether or not actual dumping was involved, there is no dispute that Japanese vendors were aggressively marketing while U.S. companies were ill-equipped

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to absorb the price cuts imposed by the slump-related oversupply of semiconductors. As a result, imports are dominant in a number of arenas, and poised to assume the role in the development of new chip generations played in the past by U.S. vendors. The administration is probably most upset about the implications for its defense buildup of ceding the future of chip technology to foreigners. Others note that a Japanese role in creating new chip architectures could give them the wedge into the hardware market they have hitherto lacked. Forget the fifth generation. This is the Japanese initiative that counts.

5 & 6. IBM's Token Ring announcement and the MAP-TOP demonstration at AUTOFACT

Neither was everything it could have been. The long-awaited token ring LAN from IBM turned out to be just another PC network for now, while gremlins kept messing up the MAP-TOP demonstration in Detroit. But both address the same general problem, and both promise to be widely accepted answers. Both are responses to user demands (in the case of MAP-TOP, major users are the driving force) for effective data communications, one intravendor (the vendor that matters), one multivendor. More importantly still, both validate and establish standards. IBM has ignored the capabilities of Ethernet and worked out its own internal networking standard, while MAP-TOP implements emerging international standards. In this difference, both are being true to their essential nature. But it doesn't signify: users demand standards at both levels, and for supplying those standards (rather than particular products), both are top stories.

7. Multiprocessor and minisuper startups

This was the year that multiprocessing technology (including parallel processing) began to move from the Times science section to the business pages. Not all the news was good. Though Encore's recent travails have drawn the most press, it is not the first to stumble, nor will it be the last. But possible failure faces all startups, and these have at least demonstrated that multiprocessing will be a major way in which performance increments are added to future computers. This is crucial in many compute-intensive applications, where the multiprocessing startups Sequent and Arete have established a foothold.

The market has attracted other startups that have benefited from VLSI technology, without necessarily going the multiprocessor route. One viable alternative is the minisupercomputer; Convex, for example, packages the performance of a small Cray in supermini functionality, with supermini pricing. Alliant offers multiprocessing, but the basic CPU is also available as a sleek 1-MFLOPS supermini. And then there is the new Masscomp "microsuper," allegedly offering up to 10 MIPS/13 MFLOPS. Bill Poduska's plan for a 20-30 MIPS workstation compatible with the Apollo line would extend Masscomp's approach. The very names -- minisuper, microsuper -- suggest the melding of technologies that has begun.

8. AT&T (mostly) unshackled by the FCC

Godot was downright punctual compared to AT&T's long-awaited emergence as a computer superpower to rival IBM. It didn't happen in 1985 either. On the other hand, AT&T has had to play its own waiting game. The antitrust settlement left Judge Greene as, in effect, the czar of telecommunications, while it did not end the restrictions on AT&T activities imposed by Computer Inquiry II. In a series of decisions at both levels, AT&T is gradually winning the maneuvering room it wants. In its most important victory to date, the FCC will allow AT&T to coordinate computer, telecommunications, and long-distance sales.

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There still has to be something to sell. Even some AT&T execs will admit that the company's computer strategy has not yet jelled. The Unix PC experiment, AT&T's major foray in 1985, proved a nonstarter -- its sole success at the micro level is an XT clone. In the midmarkets, AT&T must transform an operating system that has won adherents because of its openness and portability into a marketing tool comparable to the proprietary architectures of its rivals. But AT&T has enough capital and expertise to make a strategy work, if it is feasible; now it has a legalized incentive to create the strategy.

9. The erosion of Control Data

It is never pleasant to watch a giant in its death throes. CDC is a certifiable giant in the computer industry; many fear that it is dying. Finances are in a mess. In computers, it has not been adding new lines to retain its base, and the future of its ETA supercomputer subsidiary is in doubt. In storage, it has cut out floppy production, a decision that, together with its earlier failure to compete in 3380-class systems, repositions it as a supplier for the upper end of the midmarkets. Even a pared-down CDC may find it hard to survive. The latest casualties of its financial crisis are the executives who resigned rather than face possible legal actions without the liability insurance that was canceled in the wake of a shareholder suit.

The significance of CDC's fall from grace, even if it averts dissolution, is that no one else is offering the full gamut of services in which it pioneered. The likely successors will be Japanese giants like Fujitsu.

10. The stuttering of Lotus, Cullinet, and other software leaders

Beset by falling prices, software vendors also face their own user revolt. PC-based software vendors are finding future growth rates stymied by a shift in PC purchase patterns, as new machines are increasingly bought by users who already own the most popular software products. The vendors' anger at rampant copying is met by demands for site licensing. Companies like Lotus are struggling to come up with new entries, whether by developing them internally or purchasing other companies. The strategy may pan out eventually, but it is a gamble on which some will inevitably lose. Throughout the third-party software market, the effect of lower hardware growth rates is already starting to be felt. The relationship between hardware and software is mutually beneficial or a double-bind, depending on whether hardware sales are up or down: computers are just pieces of metal without software, but software won't sell well unless there are a sufficient number of new computers also being shipped.

Other candidates for the Top Ten

Space and tradition dictated the decision to keep the list to ten, but any choice of stories limited to a certain number, whether one, ten, or twenty, must omit historic events, important product introductions, and crucial trends. The collapse of the home computer market orphaned well-known products, notably Coleco's Adam and IBM's PCjr., and added to Apple and Commodore's woes. The advent of PC CAD has implications that will fully develop in a couple of years, when the workstation and PC CAD markets in effect will merge, but users' decisions to work on ATs is already affecting established vendors. Compaq's continuing success and the IBM-Microsoft agreement to work jointly in the future testify to the strength of the DOS standard. Intervendor software links with IBM are important now, and the IBM-MCI deal will be by the early 1990s.

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Subterranean Currents: Shifts in the Executive Suite, Mergers and Acquisitions

Squeezing Steve Jobs out of Apple was not one of the top ten or twenty stories of the year, except maybe in People, but Jobs' semi-involuntary exit, like Poduska's more graceful egress from Apollo, represented a transition from entrepreneurial to managerial leadership at a major vendor. It is not accidental that the process seemed particularly visible in 1985. The underlying explanation was a factor shaping both the slump and the managerial revolution: the maturation of important sectors of the computer industry.

A number of important breakthroughs around 1980 changed computer technology and developed new markets. Entrepreneurs who took advantage of these changes founded companies that recast the industry. However, the high-growth years for those technologies and companies have now past. As sales slow, the most pressing need is effective marketing, while leadership requires not an eye for the far horizon, but a squint at the bottom line. Companies that were not forced to turn to new leaders in 1985 will eventually have to make the same shift.

Some of the same pressures are at work behind the move towards consolidation, both acquisitions and mergers (still, despite Asher Edelman, mostly voluntary). This year the trend was especially noticeable in the software sector. Elsewhere the Burroughs-Sperry merger turned out to be one of the year's great nonstories, but the Convergent Tech-3Com twosome probably portends other marriages to come. Smaller vendors, facing low growth rates, seek to expand by synergy. Other matings will be acquisitions by one of the giants to add new marketing or technological dimensions. AT&T's name has been linked with every possible computer manufacturer except IBM; some day one of the rumors will be true. IBM itself may have to make more of a habit of carrying its checkbook around when it visits other vendors if it is to meet its revenue goals.

From the Crystal Ball: The Top Stories of 1986

- Rebounding large-scale system sales will stimulate growth in the value of 1986 shipments in the vicinity of 15% over 1985's poor showing.
- H-P's RISC-based Spectrum series will signal the biggest gamble yet by any major computer vendor.
- IBM will announce an engineering workstation (soon), a uniprocessor 3090, new 4300s, a larger S/36, "Son of PC-2," and a laptop PC.
- Cheap IBM-compatible business PCs, often Asian, will thrive in the home.
- IBM will lose PC market share but still win as its competitors carry the DOS standard to new markets; Commodore and Atari will bleed.
- CDC's agony will continue.
- A multiprocessor VAX will appear from Digital.
- The rise of DEC-compatible systems will be a major midmarket story.
- Storage Tek will emerge from Chapter 11.
- A major merger will occur in the Bunch.

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EDP industry report

● THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"The Gray Sheet"

D.C.BELLOMY, ASSOC.ED. DEC. 11, 1985 ● VOL.21, NO.16 P.J.MCGOVERN, PUBLISHER

IDC INTERNATIONAL DATA CORPORATION

THE SOUL OF THE NEW DATA GENERAL AND DIGITAL MACHINES IS IN THE SOFTWARE

The surroundings for their recent announcements symbolized the contrasting styles at Data General and Digital Equipment Corporation. DG chose theater on November 18 by showing off their answers to Digital's 8600 and MicroVAX II amid the Cassatts, Picassos, Bacons, Warhols, and Lichtensteins at Christie's auction house on Park Avenue. Leading off the event was a presentation by H.G. Wells's Time Traveller; rounding it off was a luncheon reception at Regine's.

At its announcement of an 8600 upgrade two weeks later, Digital strove to maintain a serious mien. At least the announcement wasn't in a storeroom full of boxes, the way it was for the 8600 last year, but the stark U.N.-style auditorium in Marlboro, Mass., wasn't much glitzier. The flashiest part was the high-intensity light a technician would focus on journalists and consultants whenever they asked questions, presumably to make them feel like felons.

This time, though, different styles reflected different moods as well. No matter how much Ken Olsen and others for Digital kept saying they were excited, missing was the ebullience with which Olsen unveiled the original 8600 or the MicroVAX II. Ed de Castro, on the other hand, set the tone for DG by calling its event "the most important product announcement this company has ever held."

It was important. Both companies have reeled under the impact of the Great Softness on midscale sales, but DG has been hurt more and could afford it less. It had to react to Digital's high- and low-end successes, and last month it did. The smiles on Park Avenue were ones of relief, while the sobriety at Marlboro was not glumness -- Digital wasn't in a make-or-break situation.

The announcements highlighted other differences between the two companies, as well as some important similarities:

- DG's new hardware and software indicate a desire to reemphasize its former scientific/engineering base.
- Digital would rather users focus on the performance capabilities of VAXClusters than on the MIPS of even its most powerful machines.
- Willy-nilly, ready or not, both companies are entering a future that will be software- rather than hardware-driven.

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DG Ups MIPS Ante, Plays Integration and Distributed Processing Cards

If it had been anybody else, it might have sounded smug and smarmy, but coming from Tom West, hero of Soul of a New Machine, it had the understated eloquence of a Gary Cooper: at Data General, "we don't outinvent the competition, we outimplement them." He was speaking in particular with reference to four hardware innovations in the announcements:

- The basic model of the new high-end DG system, the MV/20000, is compactly packaged on a single-board CPU (in contrast to, taking the obvious example, 17 boards in a VAX 8600).

- The MV/20000-1 would be, at 5.5 MIPS, the fastest supermini uniprocessor -- equal in performance, DG claims, to IBM's 4381-3.

- Slipping in a second board creates a dyadic MV/20000-2 and 10 MIPS, a performance unparalleled among traditional supermini vendors.

- The new entry-level Eclipse, the MV/2000 DC, really has compressed everything on a single chip, including graphics -- DG need not plan how to tell its VARs they will have to switch to a "MicroVAX III."

After Digital's announcement, all of West's comments are still germane except the second. At the uniprocessor level, Digital's 8650 is faster. But the larger point that West wanted to make is still valid: DG's engineers have indeed once again made the cost/performance leaps on which the company depends.

The significance of the technological improvements that West took such pride in becomes obvious when one turns to the more consumer-oriented cost/performance data on which other presenters dilated. Data General is claiming new cost/MIPS standards at both ends of the midscale spectrum. It boasts $42,550 per MIPS for an MV/20000-1 with 4MB of main memory, and $33,700 per MIPS for a 20000-2 in the same configuration. The cost per MIPS of an MV/2000 is claimed to be $14,600, "the industry's lowest . . . for any one-MIP class system."

To its credit, DG (like most of its competitors) is well aware of MIPS pitfalls, and is stressing an alternative measure: cost per user in typical configurations. An MV/20000 business system configured for 75 users (i.e., 12MB memory, a 592MB disk, 10 graphics terminals, 65 intelligent terminals, 11 letter quality printers with feeders, one 600 LPM line printer, two 6250 bpi tape drives, and both asynch and synch communications) would come to $639,000, or $8,529 per user. Configured for 175 users (e.g., 28MB memory, 1,700MB of disk storage, 25 graphics terminals, etc.), a complete MV/20000 system would jump to $1,620,000, but slide to $6,230 per user. DG figures that a realistic configuration for an MV/20000-2 would come to as little as $5,000 per user.

After reaching a rough 50-50 split between office/general commercial users and their traditional scientific/engineering market, DG's strategists saw that they would once again have to solicit their original base now that CIM has become a buzzword. The hardware of both new systems has therefore been conceptualized with technical uses in mind. DG is offering the MV/2000 in four workstation versions competing with the VAXStation II, the single-user DS/7500 series and multiuser DS/7700 series. It will also package the MV/20000-1 in a rackmounted version for OEMs, system integrators, and scientific/engineering users who need 5.5 MIPS to offload compute-intensive applications.

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DATA GENERAL MEDIUM- AND SMALL-SCALE SYSTEM UNIT SHIPMENTS, 1979-1985
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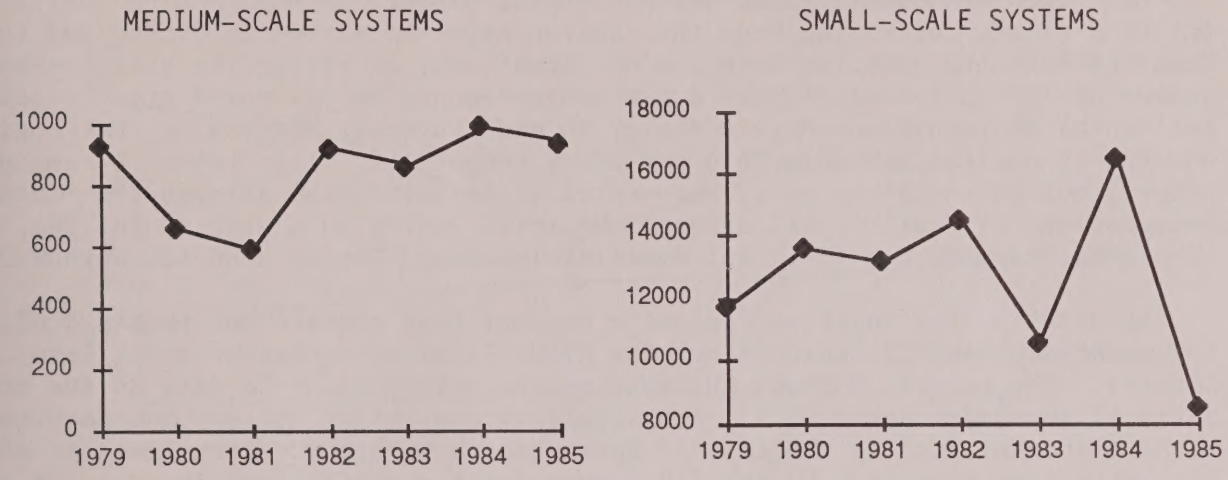

The new software offerings have also been tailored to appeal to technical types. The workstations have been fitted with a portfolio of user-definable menus, windowing with concurrent processes, and E-mail, called DG/STAGE (Standard Application and Graphics Environment). DG/STAGE in turn is the major innovation in TEO (Technical Electronic Office), which Data General hopes will do for it in engineering/manufacturing circles what CEO has in the office -- 5,000 CEO site licenses have been granted, accounting for some 120,000 users.

Like its office automation counterpart, TEO has been designed to meet the requirements of information managers to integrate all aspects of their work. The working assumption is that architects, manufacturers, and others interested in technical computing are also running businesses. TEO therefore weds CEO's filing, document creation, editing, and other functions to applications helping out in design, analysis, project planning, and process control.

The sleeper among the software announcements is AOS/DVS, a variant for distributed environments of DG's AOS operating system. Any AOS/VS software will be compatible with AOS/DVS, which will allow transparent access to all data and resources on the system. For now it will be targeted at technical users, but DG apparently has bigger plans for it. The president of its Technical Systems Division is quoted as predicting, "The engineering workstation marketplace may be the departure point for distributed information processing, but, before long, this is how all integrated organizational computing will be managed."

For all the wizardry of its hardware engineers, this emphasis on software is probably the best possible strategy DG could devise. Stuck at under 4% of small- and medium-scale sales for 1983-84, it has eked out a mere $1.3 million in profits over the first three quarters of 1985 in contrast to the $73.2 million netted over the same period last year. The new systems are a welcome sign of life, but offer no panacea. Even if successful, they will depress sales on DG's current line, especially the already weak MV/4000. To differentiate itself from Digital and its other competitors, DG can't depend solely on hardware like 10-MIPS superminis. It will have to parlay the lesson of CEO by focusing on its software's ability to integrate and distribute processing functions.

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Digital's 8650: Less than DG's Top Supermini, but "More than a Mainframe"

Ken Olsen has been alternately portraying Digital as the ranking challenger to IBM's title, retreating from the confrontation he seemed to crave, and then throwing down the gauntlet once again. Sometimes, as during the question-and-answer period following Digital's new announcement, he has moved from genial Bill Cosby to pugnacious Marvin Hagler in mid-sentence. Stressing that Digital now ran up against IBM more than any other competitor, Olsen tried to remain urbane, but grew visibly more exasperated as he castigated alleged IBM misrepresentations of what Digital offers. He tried ending on a grace note, "We have great respect for IBM," but immediately added, "or we used to, anyhow."

Ironically, the ghost at Digital's banquet that day was not the hold of IBM mainframes on MIS managers but the MIPS claims of supermini rival Data General. The new VAX 8650 is the most potent uniprocessor to date in the traditional supermini arena (i.e., compatible with existing systems and packaged without special cooling elements). Seven boards have been streamlined to slice the cycle time down from 80 to 55.5 nanoseconds, a performance increase of 44% over the 8600. The seven boards will cost $125,000 as a field upgrade (or, if you don't own one of the 1000+ 8600s out there, $475,000 for a new system).

The presenters avoided MIPS as much as possible, but the 8650 should clock out between 6 and 6.8 MIPS if you measure performance that way. Other changes reducing the number of operations required to execute certain programs will mean performance jumps of up to 53% over the 8600 in some applications. These improvements accompany a doubling of memory capacity in both the 8600 and 8650.

Nevertheless, if the 8650 will outrace DG's MV/20000-1, by late spring it will have been overtaken by the 10-MIPS 20000-2. Faster VAX uniprocessors were promised for the future, and dyadic systems are eventually expected. But Olsen and company obviously feared that the press (not to mention possible customers) might be blinded by the vision of 10 million instructions per second.

From the outset, therefore, Digital's real strengths were portrayed as its software and networking. Software, Olsen explained, was "probably the most significant factor" in the VAX success story. Applications now total over 3,000 in 16 languages. But the future of the VAX line belongs to the special subset of software called networking. Over 35,000 Ethernet nodes were claimed, most using Digital's gateways to SNA, X.25, and public networks. But the primary emphasis was on VAXClusters, which Digital claims can give the combined performance to zip by not only an MV/20000-2, but even an IBM 3090-400. There are over 3,000 VAXClusters worldwide today, and 80% of all 8600s are clustered.

It was odd, then, that Digital did not more clearly articulate the significance of the software announcements made the same day. Of particular import were the CODASYL and relational DBMS programs that will at last operate over VAXClusters and access remote databases through DECnet software. A VAXCluster

PERFORMANCE COMPARISON, VAX 8600 AND 8650
(Source: Digital Equipment Company)

	S.Prec.Whetstone	Linpack MFlops	U.S.Steel Cobol	TP Throughput
8650	6850	1.79	1485	13,650
8600	4725	1.19	1029	10,300
Increase	45%	50%	44%	33%

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PROPORTION OF TOTAL SHIPMENT VALUE OF SMALL- AND MEDIUM-SCALE SYSTEMS ACCRUED BY IBM, DIGITAL, AND DATA GENERAL, 1981-1985 (EST.)
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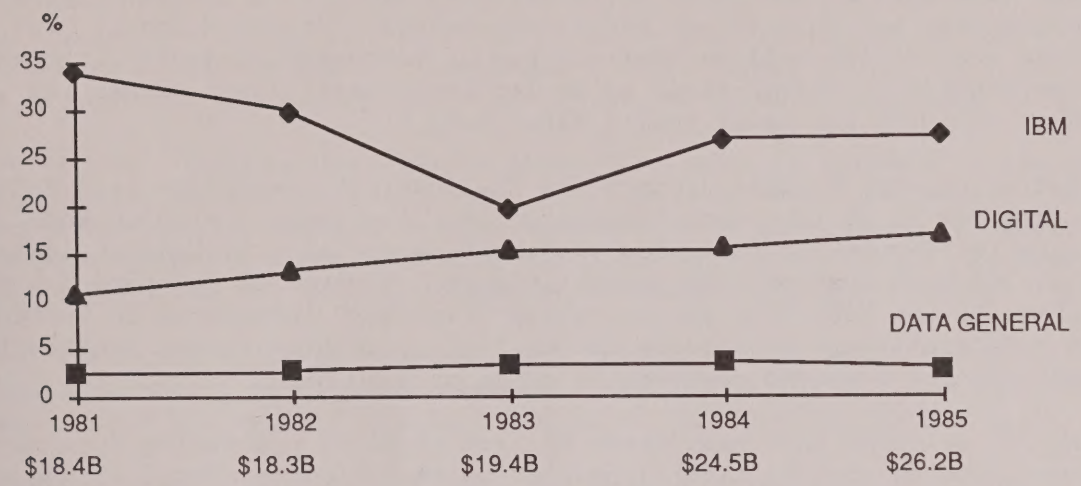

is less, not more, than a mainframe without such capabilities, yet the Digital people seemed flustered by the few questions dealing with software.

Digital seems only partially prepared for its approaching crossroads. It knows that only so much performance can be wrung out of its current supermini technology, and has perceptively developed the VAXCluster concept as an alternative. Yet, however much lip service it pays to software and networking, its marketing reflexes are still sometimes a traditional hardware manufacturer's.

To remind us how long those reflexes have had to develop, and how much Digital and the computer industry have changed, the announcement last month of a new high-end entry to the 16-bit MicroPDP-11 series served as an occasion for Digital to celebrate the fifteenth anniversary of the PDP-11 family. IDC counted 290,000 PDP-11 systems installed worldwide as of January 1, 1985.

PERKIN-ELMER BITES OFF THE CRUNCHER

Perkin-Elmer has spun off the Data Systems Group, one of its six business segments, as a separate company, Concurrent Computer Corporation. Right now P-E will own 99% of the venture, with the remainder going to the former Data Systems execs who will run it. Concurrent will sell public shares at some later date, but P-E anticipates keeping an equity share greater than 80%.

The strategy seems to be to maintain the synergy of a computer vendor closely tied to an electronics giant, but to widen the potential market for its computers. The fiscal year that ended on July 31 was the best yet for the Data Systems Group, with net sales growing 11.2% over FY1984. At 19.6% of total sales before deductions for intersegment transfers, it ranked beneath only the semiconductor equipment and instruments groups in P-E's organization. In orders for the quarter ending October 31, it was well above slumping chip manufacturing and not far beneath instruments. Its long-term growth has not been spectacular (3.6% p.a. since 1981), but then neither has P-E's at 4.0%.

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The problem is that P-E computers have been wedged in a niche. Some 550 3200-class supermini systems were shipped in 1984, but most of them were to members of the scientific/engineering community who associated the P-E name with technical instruments and appreciated its Fortran capabilities. The company does have a small base in transaction processing and other general-purpose areas, but this is not widely recognized. Horace McDonell, P-E's chairman and CEO (as well as chairman now of Concurrent Computer), noted that "the perception of Perkin-Elmer as an important participant within the computer industry has never really taken hold."

Adding urgency to this concern was the internal perception that P-E computers were now at an important turning point. The company started working in the parallel processing field ten years ago, and claims to have an installed base of 300 such systems, the largest around. Admiral of its parallel processing fleet is the 3280 MPS, the so-called "Cruncher" introduced in September. Up to five additional processors can be tightly coupled to the single-CPU configuration, for a stated performance range of 4-20 MIPS.

EDP/IR believes that most users of true parallel processing systems will for some time to come be tightly coupled to the scientific/engineering market (see Vol. 21, No. 10, September 25, 1985), but P-E is on record as thinking otherwise. Jim Sims, formerly general manager of the Data Systems Group and now president and CEO of Concurrent Computer, has called parallel processing "the architecture of the next ten years" and predicted that "every processor announced by Perkin-Elmer from this day forward will be a parallel processor."

Those announcements will now be coming from Concurrent Computer Corporation, a name chosen to associate its products with parallel processors rather than differential scanning calorimeters or projection mask alignment systems. And if McDonell and Sims's expectations for parallel processing do not pan out, it is easier to sell a separate corporation than an internal division.

MAINTAINING PROFITABILITY: FINDING NEW WAYS TO MILK THE SERVICE COW

In a year of stagnant sales of new hardware, the major vendors have been even more dependent than usual on other sources of income. Of these, few have been more remunerative than maintenance and service:

- In FY1984, IBM's maintenance services revenue totaled $5.3 billion, 11.5% of total income and more than 1984's PC-generated revenue.

- Digital's "service and other revenue" segment for its most recent fiscal year came to $2.15 billion. Subtracting the $276 million that IDC analysts estimate was accrued by Digital's packaged software, processing services, and professional services businesses in calendar year 1984 leaves between $1.8 and $1.9 billion for service, customer training, replacement parts, and a limited amount of equipment rentals.

- Thus services now account for some 28% of DEC's total revenue, a percent that has risen significantly over time.

Services are also becoming increasingly important to companies such as CDC, Sperry and Burroughs. As hardware sales level off, services have become

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both a source of growth and profits, they are also a way of keeping customers happy and distinguishing themselves from companies with more modern machines.

However, manufacturers have to work harder to milk the service cow than ever before. The three biggest problems are pressure from third-party service companies; the increasing number of multivendor user sites and the attendant unwillingness of MIS managers to maintain a large number of separate service contracts; and the increasing reliability of most hardware systems.

The typical response has been to widen the number of vendors' products a particular manufacturer will service. This appeases users who have to keep a shorter phone list of numbers to call when something goes down, it undercuts the one-stop-shopping allure of third-party companies, and it offers a profitable way to utilize the maintenance crews who have to be kept on call anyhow.

Different companies are adopting contrasting strategies, from specialization to the complete maintenance service associated with CDC. IDC's Customer Service Program has been investigating some of the varying approaches:

Digital actively markets its field service organization, which has over fifteen years of experience. Since 1983 it has offered its DECompatible service, which maintains non-Digital equipment attached to their systems. With the growth of networking, this targets an ever-expanding market: the service has grown from 30 products to some 300 from 35 vendors, including the IBM PC. One plus is that its maintenance personnel can urge users "trade up" sickly DECompatible products for Digital equivalents.

Individual contracts with users sometimes include the servicing of mainframes, but if so Digital subcontracts the work out. Subcontracting in general is initiated when Digital doesn't service particular products but wants to maintain a single point of contact with its users.

Perkin-Elmer has also used its service unit as a marketing tool for its own products. It specializes in DG NOVA 3 systems, which it tries to supplant with P-E's XELOS line. Presumably Concurrent Computer will do likewise.

Honeywell expanded into the third-party market in November 1983 by bringing other vendors under its "TotalCare" service program. Since then it has been vigorously pursuing the end user's maintenance dollar. For example, it has developed a remote diagnostic set for IBM-compatible workstations, and has established a set discount policy for Apple equipment. It has signed over 30 service agreements with specific equipment manufacturers.

Sperry is the most recent hardware manufacturer to go full steam ahead into the third-party service market. Since announcing its expanded "Customcare" in January 1985, its 3,500 field engineers and the rest of the 8,000-strong U.S. third-party staff have been scurrying for customers while the company establishes a parts inventory that Sperry values at over $230 million.

The catch is that everyone is saying that they will be market leaders in the service segment, which would be implausible even if the established non-computer third-party companies like Sorbus were not also in the race. But even if few make it to the mountaintop, all can hope to escape the Slough of Despond into which vendors depending just on hardware and software sales might sink.

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• CHIP WAR MANEUVERS. Japanese semiconductor manufacturers have been treading carefully recently. Their recent price increases were inevitable responses to the changing yen-dollar ratio, but they quietly let it out that the cuts were also reactions to U.S. concerns about "dumping." However, there seems little chance of a negotiated "peace without victory" in the trade conflict, especially after the Reagan administration bypassed U.S. vendors to file an antidumping case of its own against Japanese manufacturers of 256K chips. The significant aspect of the new case, aside from its derivation, is that it is designed to protect future as well as current technologies against dumping.

• RESCORING AT ENCORE. Resolving to put all its remaining eggs in one basket, Encore is shifting resources from its workstation and terminal lines to develop the Multimax "extensible architecture" further. Those resources, however, will not include the executives who have jumped ship in recent months, or the 17% of the workforce who are being laid off. Encore has finally shipped its first Multimax system to Argonne National Labs.

• LEE DATA ADDS DATASTREAM, PHAZE. A little over a year since its abortive effort to buy Visual Technology's non-IBM terminal line, Lee Data is now thinking All-Blue. Acquiring privately-held Datastream Communications, Inc., will bring Lee Data protocol conversion from asynch to 3270 environments as well as the 3270-to-asynch connections in which it pioneered. Phaze Information Machines Corp. will allow Lee Data to offer options for 3270 plug-compatibility with IBM controllers in addition to the system compatibility hitherto held out.

• ADAGE/LEXIDATA DEAL. On December 9 the two ailing graphics vendors signed a final agreement laying out the details of their announcement of a month and a half ago to merge. Lexidata can bring to Adage's predominantly IBM plug-compatible line its ties to OEM channels, a broader product mix at the lower end, and future technologial enhancements (e.g., its graphics windowing).

• ETA SETS ESTIMATED TIME OF ARRIVAL. ETA Systems, Inc., the supercomputer spinoff of CDC, has set a spring 1987 delivery date for an eight-processor ETA-10 system to the John von Neumann Center at Princeton. In the meantime the NSF-funded Consortium for Scientific Computing using the new Princeton facilities will make do with a CYBER 205, to be made available this month.

• AMDAHL DOUBLE-DENSITY. PCM CPU vendors are beating PCM peripherals to double-density 3380s. Amdahl's edition, which will be available as an upgrade and freely intermix with single-density versions, ships in 4Q 1986.

• COMMODORE STILL SALUTES APPLE. Just as Commodore followed Apple's lead into the home PC market, it has also been trailing Apple into the executive washroom at Pepsico. Eight months after leaving Pepsi for Commodore, Thomas J. Rattigan has moved up to the presidency and COO duties under Marshall F. Smith. Commodore, however, saw the need for organization men in preference to dynamic entrepreneurs before Apple did: Tramiel went long before Jobs did.

• SPERRY SAYS NO TAXATION WITHOUT APPLICATION SOFTWARE. It wasn't us, Sperry retorted after news accounts linked it to the IRS computer snafus delaying last year's returns. The hardware supposedly was up 98% of the time; the kink, Sperry alleges, was in the application software developed by the IRS.

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EDP industry report

● THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"The Gray Sheet"

D.C.BELLOMY, ASSOC.ED. DEC. 5, 1985 ● VOL.21, NO.15 P.J.MCGOVERN, PUBLISHER

IDC INTERNATIONAL DATA CORPORATION

IN CIM LEXICON, MAP IS THE ACRONYM FOR MOTHERHOOD AND APPLE PIE

At points last month Autofact seemed like it should have been called Autofad, so many vendors were spraying press releases saying they want to and eventually will support MAP. The sense of witnessing a publicity event was reinforced by the crowds, at over 33,000 up almost half again from the previous attendance record for an Autofact conference.

Or maybe Autofact was really Autofiction. The multivendor MAP/TOP demonstration drawing the crowds did not always produce at the end of the simulated assembly line what was ordered at the start. Also, there were few new product announcements of any note. The most significant no-show was an engineering workstation from IBM, which is apparently trying to consolidate control of the tenterhook market after its initial successes with Sierra and the token ring.

Yet it actually was an Autofact conference. The fact is, the key variable in CIM is the middle letter. Computers will be able to achieve significant gains in manufacturing productivity only when they can be effectively integrated. The crowds, the endorsements, the enthusiasm testified to the importance of the task; the hitches underscored its magnitude; and the successes augured its probable impact on the factory of the future:

- IBM, AT&T, Intel, Industrial Networking, Charles River Data Systems, Concord Data, and Motorola are now shipping MAP products.
- Following soon will be Gould and Advanced Computer in 1Q1986, and Digital in the second quarter.
- Of the $40 billion GM will spend to automate its divisions by 1989, much will go towards implementing MAP in all plants over the next five years, 14 of them starting the countdown within the year.
- Although three GM plants are currently scheduled to run MAP next April, Ford might beat them out for the first MAP installation.

The MAP 2.1 demonstration involved customized versions of the venerable "Towers of Hanoi" game (those seven concentric rings and three poles you might have played with as a kid). Games were ordered with any mix of red, white, and blue components (obviously chosen to placate Rambo for the name of the game),

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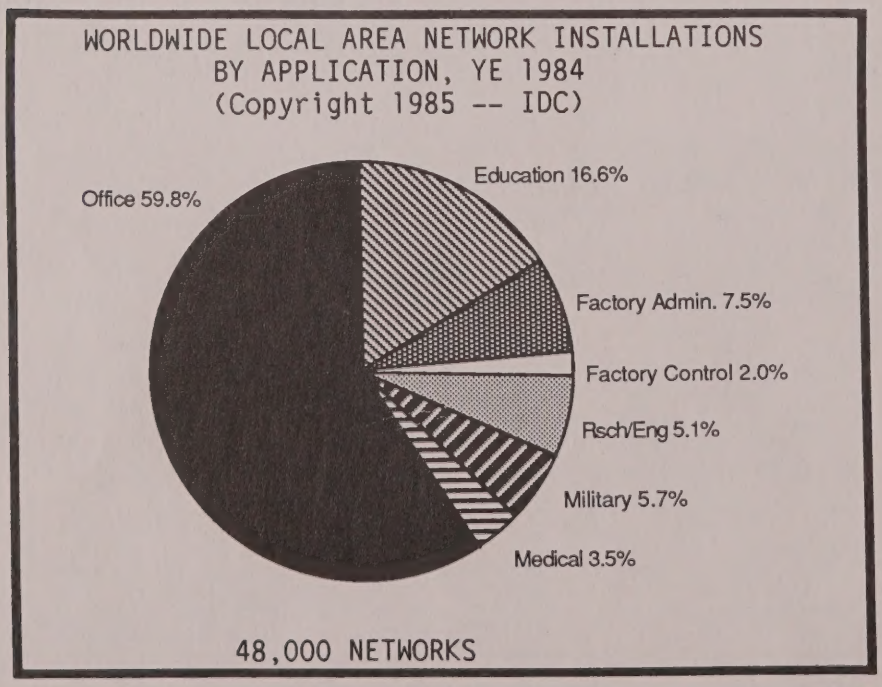
assembled, and finally inspected for accuracy. The bugs were real, but the wonder is that, with 21 vendors at 10 MAP and 8 TOP stations passing information back and forth, there were not more topless towers of Ilium. And however erratic the communication at times, it beat what silence would have said.

Autofact, MAP, and CIM in general address two truth-or-consequences issues helping shape the rest of the 1980s. First, there is the diminishment of America's manufacturing base. Factory orders slipped another 1.1% in October, and overall for 1985 are up only 2.1%. Shortly after Autofact ended, Deputy Secretary of Commerce Clarence J. Brown was stressing that without new automation technologies, "our trade situation will get worse before it gets better."

The other factor bringing CIM to a simmer is the larger significance of computer integration. Manufacturing will never comprise more than a fraction of the total information industry. As for the terrain to be MAPed, there were more general-purpose LANs installed in schools and colleges on January 1, 1985 than in factory administration, factory control, and research/engineering combined. True, this doesn't count proprietary LANs, but even so manufacturing LANs will remain less significant than office networks. MAP mania, then, is a wider phenomenon than CIM, reflecting users' thirst for integration standards.

Ergo MAP/TOP. Before Autofact, Boeing's Technical and Office Protocol seemed a poor relation of GM's Manufacturing Automation Protocol. The top five layers of TOP are supposed to be identical to MAP, with the bottom two based on IEEE 802.3, Ethernet, or (as of next year) 802.5, rather than broadband IEEE 802.4. Like GM, Boeing has tried some negative reinforcement with threats to give preference to vendors of TOP-compatible equipment. But probably because Boeing has nothing like GM's presence in the market, companies signing on for the TOP segment of the demonstration at first lacked the MAP lot's clout.

By the end of Autofact, though, TOP looked like there was now a chance it might get there. GM has indicated that it will join the TOP user group. As to vendors, Honeywell, NCR, Intel, Computervision, IBM (with a PC prototype), Sun Microsystems, ATTIS, and Charles River Data Systems/ACDS Graphics Systems are shipping TOP products now, with HP and Wang to follow. There is still no guarantee that TOP will be the medium through which a communication standard for multivendor sites is developed on the basis of ISO's OSI for different systems in an office environment. But the new respect with which it is now regarded shows that many want to believe, and are looking to the MAP/TOP combo to help their unbelief.



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VENDOR SHARES OF VALUE OF COMPUTER SYSTEMS INSTALLED BY SURVEYED DISCRETE MANUFACTURING COMPANIES, YEAREND 1984*
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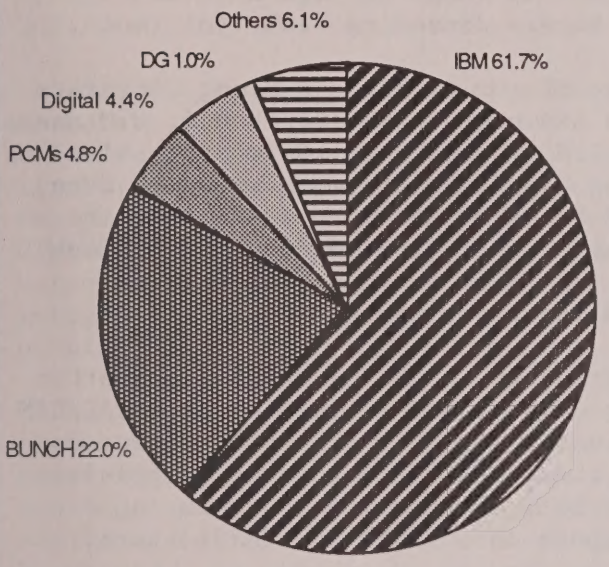
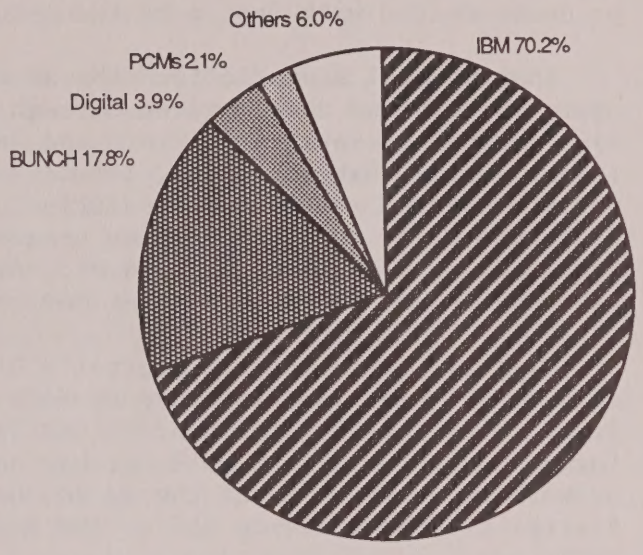
DURABLE GOODS



6,883 DATAFILE SITES

AEROSPACE, AUTOMOTIVE, ELECTRONICS



4,612 DATAFILE SITES

*Users surveyed by the IDC Datafile are typically MIS managers. Data portrayed thus may not fully encompass departmental or shopfloor systems.

Hardware Vendors as a Factor on the Factory Floor

To note the wider significance of MAP is not to underplay the importance of CIM. Sales to finished goods manufacturers already represent around 15% of the U.S. computer market, and conceivably could take a larger share if manufacturers find that CIM investment really can dramatically halt the slide in factory profits. When the pump-priming investments in new computers and software are combined with the broad interest in how MAP works out, it is easy to see why so many hardware vendors are thinking CIM these days.

IBM. Just as Big Blue's commitment to dominating the office was once indicated by its move into typewriters, its desire to play a major role in the developing manufacturing market is shown by its decision to sell robots. IBM knows that it will not take a share of factory sales anywhere near what it has achieved in corporate America, which is why it has had to take part in the multivendor-oriented MAP project. But to grow to a $100 billion company by 1990 requires IBM to go full steam ahead in every segment of the industry.

Even with a workstation on hold (til next month, IDC has been told), IBM's factory strategy is fairly clear. Its CIM workhorse will be the S/1, which offers the X.25, ASCII, and bisynch communications flexibility that users want. The S/1's success with VARs (about 22% are sold that way) is also a plus, since specialized systems are often required and blue labels do not mean that much anyhow in blue-collar shops. International standardization on DOS will be exploited by ruggedizing PCs and expanding their interfaces to factory products.

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Meanwhile, by leveraging off its reputation with manufacturing companies' MIS managers who have already bought 308X or 4300 systems for mainstream data processing, IBM hopes that it will benefit as CIM instigates a trend towards integrated buying decisions under the supervision of MIS departments. When fully automated factories appear and attention turns to computers to keep the assembly lines running, IBM hopes to have a full range of high availability products ready, with System 88 for manufacturers demanding fault tolerance.

In the ideal scenario for IBM, as internal communications among disparate operating systems are improved through new SNA protocols like LU 6.2, CIM users will respond by integrating more and more IBM systems into their production lines. Until that day dawns, IBM is making hay while the moon shines. Even while conceding multivendor realities, IBM is using MAP as a wedge into the factory door by tying the S/1 to programmable controller leaders like Allen-Bradley, Gould/Modicon, TI, and GE. Also, IBM will not open its gateway between SNA and MAP so wide that MAP could leave the factory.

Digital. Pointman for Digital's CIM strategy is the MicroVAX II, whether sold by DEC hands or finetuned by VARs for CIM-related activities like CAD/CAM (e.g., offerings by Applicon, GE CAE International, and McDonnell Douglas Information Systems Group). In either case the sales pitch strongly emphasizes networking. Around 8% of the system networks installed in manufacturing are Digital Ethernets, while 45% of the high-speed data links are VAXClusters.

Digital is also addressing the other major concern of many CIM users, effective design/manufacturing database management. At Autofact it repackaged a number of its products as an Engineering Data Control System (EDCS) that can track designs and notify everyone concerned of revisions.

A more complete DBMS solution was offered at Autofact by Control Data. For $1 million and up, manufacturing managers will be able to track product status from development to final inspection. The cost is high, and so are the stakes: beneath IBM and Digital are a myriad of contenders whose CIM battle plans are just now starting to coalesce.

Data General. DG is an anomaly in that its CIM strategy means returning to approaches it used before its traumatic period at the start of the decade. From a heavily technical bias, the company moved strongly into office automation to achieve today's roughly 50/50 split between the two markets. The shift meant moving from mostly OEM/VAR distribution to an even mix with direct sales. DG now has to relearn how to attract the right VARs and exude the right blue collar image if it hopes to compete effectively in the manufacturing market.

There are indications that the re-education has begun. Interest in CIM was surely a major factor in Data General's decision to focus so much of its recent hardware/software announcement (to be discussed in the next issue of EDP/IR) on scientific/engineering applications rather than office automation. To help refocus minds and shelter CIM planners from other concerns, DG has relocated its Technical Products Division in Englewood, Colorado.

As to the strategy itself, DG has been stressing communication products alongside the ubiquitous MAP endorsement. It has, for example, introduced a single-board multicommunications processor connecting Eclipse systems to SNA, X.25, and BSC devices, and announced compatibility with Ungermann-Bass's Net/One broadband network for voice and video as well as data communication.

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DG has also invested in joint development and/or marketing arrangements with several specialized vendors. It entered marketing agreements, for example, with Network Systems Corp. for heavy-duty HYPERchannel LANs, and with Computer Products, Inc., for data acquisition, process control, and test systems for the factory. Besides introducing an engineering workstation, DG has beefed up the software side as well with CAD/CAE application development agreements. Until recently it also owned a piece of Cericor, Inc., with Hewlett-Packard.

Hewlett-Packard. Of the two hardware investors in Cericor, HP was more desperate for some CAD/CAE presence. It therefore increased its share of the software company until it has now negotiated with DG to take over Cericor entirely, although DG will still share in upgrades to its technology. The move was part of a wider trend at HP. Realizing that they were lagging badly in CIM, HP execs had their manufacturing systems group managers present a unified corporate strategy back in September. Right now HP is stressing CIM system integration and state-of-the-art manufacturing expertise (around 24 of its own plants, for instance, have implemented just-in-time manufacturing).

Prime is another vendor still mostly sketching out programs rather than implementing them. Its CIM Task Force was initiated this past summer with representation from the operating groups handling engineering, product marketing, manufacturing, field support, CAD/CAM, and industry applications. The chief advice so far has been to focus on CAD and MRP II (Manufacturing Resource Planning). In CAD, Prime is looking at a possible RISC workstation from MIPS Computer. In MRP II, Prime is concentrating on communications and database management. It has also (apparently with some reluctance) endorsed MAP.

Gould. The advantage of an electronics conglomerate like Gould is not its installed computer base, which is around 1% of Digital's in small- and medium-scale systems. What a Gould can do is offer a unified electronics solution, with less dependence on third-party agreements than other vendors. IBM has to make arrangements with programmable controller vendors to insure proper interfaces; presumably Gould just has to call its programmable controller division.

Alas, it isn't that simple. Conglomerates seldom have the specialized skills to do all things equally well. Before Gould purchased it and integrated it into the Gould industrial automation systems section, Modicon led the market in programmable controllers; now Gould sells only two-thirds worth of what Allen Bradley does. It has therefore turned to Japan to OEM two models from Fanuc. Gould is also working with Concord Data Systems on MAP, first on a MAP gateway that will replace the impressive 10,000 proprietary networks it has installed in factories, and now on a MAP-compliant chip set due out shortly.

Apollo. Show-and-tell at the Apollo booth at Autofact involved an end-to-end manufacturing system, with special attention to MRP II, shop floor control, and quality control. The intended message wasn't so much a new product as a new image for CIM as a whole and not just CAD/CAM enclaves.

To build on past workstation successes while moving toward wider manufacturing horizons, Apollo has to juggle two balls. To protect its workstation base from IBM and Digital depredation, it has begun taking steps towards enough self-sufficiency in computing power to obviate the need users have felt to tie Apollo machines to larger IBM or VAX systems. But to compete in CIM, Apollo has had to begin opening its DOMAIN network to SNA and VMS. It remains to be seen how long Apollo will want to, or be able to, continue the balancing act.

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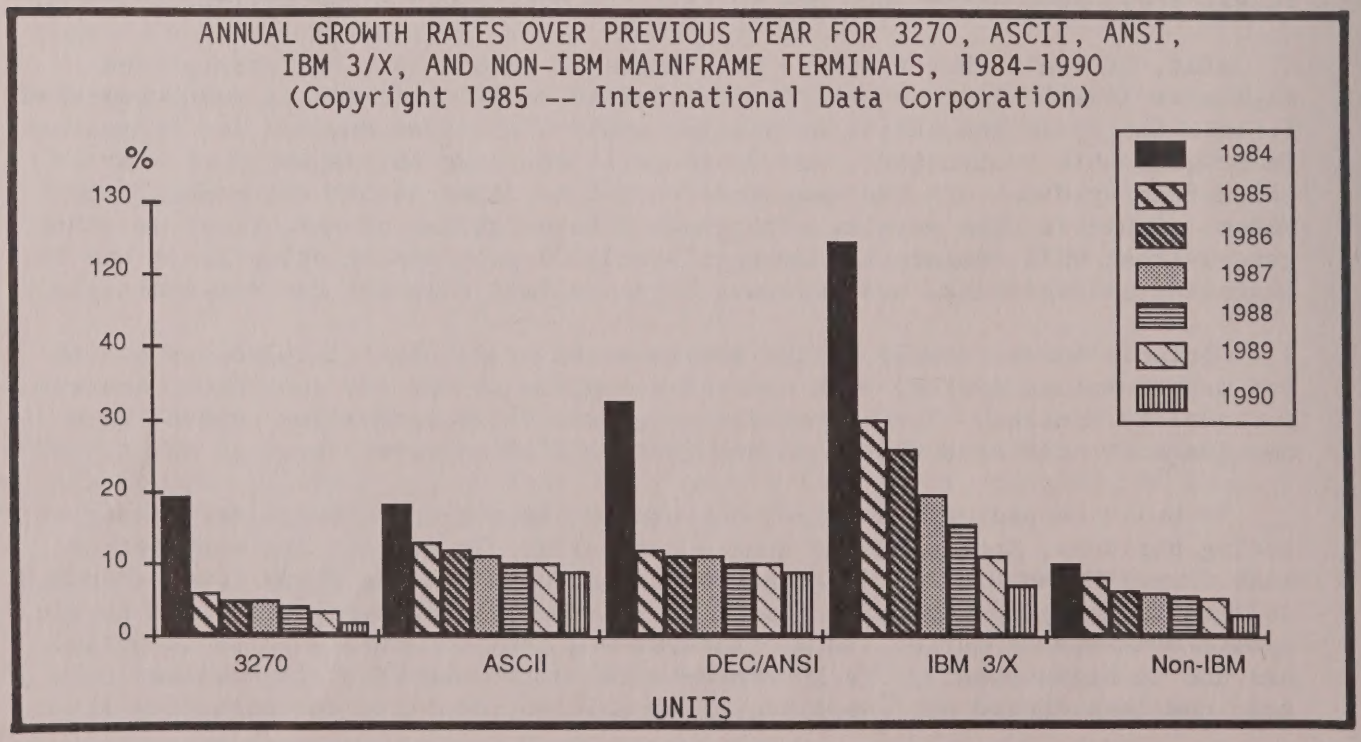
AT&T ENTERS THE TOMB OF THE UNKNOWN TERMINALS

It was almost taps for the IDC analysts who went to New York City on Veterans' Day to cover AT&T's announcement of a new 3270-compatible controller and attendant terminals. Since AT&T scheduled the presentation for the World Trade Center, which is sepulchral under normal conditions and downright dead on a holiday, there were no elevators running after 5:00 when they wanted to leave.

The report they finally brought back was mixed. The concept behind AT&T's 6500 Multifunction Communication System is to remain tethered to IBM standards while offering levels of functionality and versatility that IBM lacks. For example, the 6500 system runs on the inexpensive twisted-pair wiring used in AT&T's Premise Distribution System, Information Systems Network, PBX, and Starlan (although the 6500 line is not compatible with the latter two and AT&T has given no clues as to when it might be). IBM so far offers a twisted-pair option only on the token ring. The 6500 also combines synchronous 3270 communication with asynch VT220 emulation, and permits connectivity to three senior hosts and multihost multitasking on two of the five terminals introduced.

It must be added that the significance of the announcement is simply that AT&T, through its Data Terminal Equipment Division (né Teletype), is doing these things. There are no real technological breakthroughs involved; in particular, multihost multitasking with synch/asynch connections was pioneered by Lee Data. Also, AT&T's attitude towards ties with IBM was needlessly blurred by a two-month time lag before SNA is available on the 6500's controller.

The biggest problem, though, is that the 6500 fits only half the profile now being imposed on terminal vendors: it has higher functionality, but not lower prices. The controller, essentially a basic 16-port 3274, costs $7,880, while expansion boards for multiple synch host support, asynch support, protocol conversion, etc., require additional outlays of between $2,200 and $4,000. The multitasking terminals cost $2,895 for color and $2,645 for monochrome.



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U.S. CRT-BASED DISPLAY MARKET, UNITS (Left) & DOLLAR VALUE (Right): 1984
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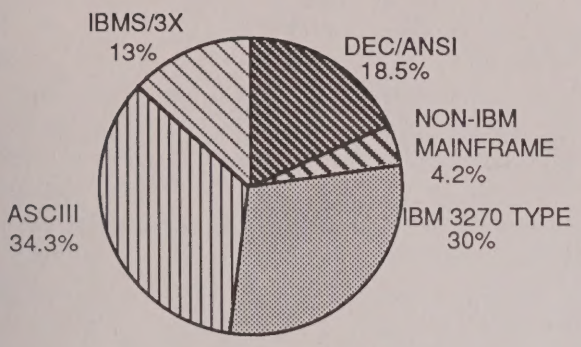

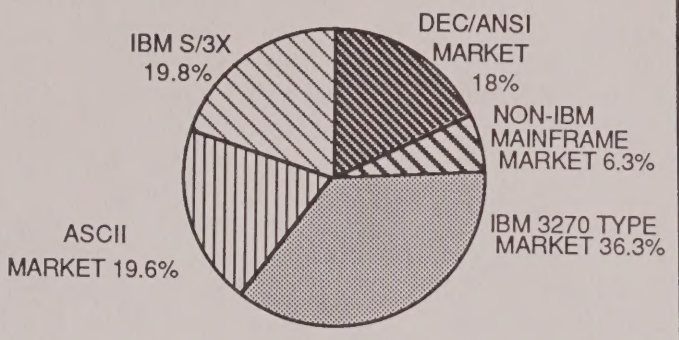

2.114 ~~BILLION~~ MILLIONS SEE VOL 21 #18 P.8

$3.201 BILLION

The trends described in EDP/IR, Vol. 21, No. 2 (May 24, 1985), have worsened over the past six months, as indicated in IDC's revised projections:

- The growth in 1985 unit shipments of 3270, ASCII, DEC/ANSI, IBM 3/X, and non-IBM mainframe terminals will be around 12.5%, less than half of what it was in 1984.
- By 1990, the annual growth is projected to have slipped under 7%.
- Overall terminal revenue in 1990 will be slightly below 1984's take.
- In the 3270 terminal market, unit shipments between 1984 and 1990 will rise only 4.2% annually, while revenue will drop 2.9% a year.

Terminal sales are being hit by a triple whammy: the PC alternative, slowing multiuser hardware sales, and technological innovations in software and communications. AT&T's announcement does not come at an auspicious moment.

U.S. CRT-BASED DISPLAY MARKET, UNITS (Left) & DOLLAR VALUE (Right): 1990
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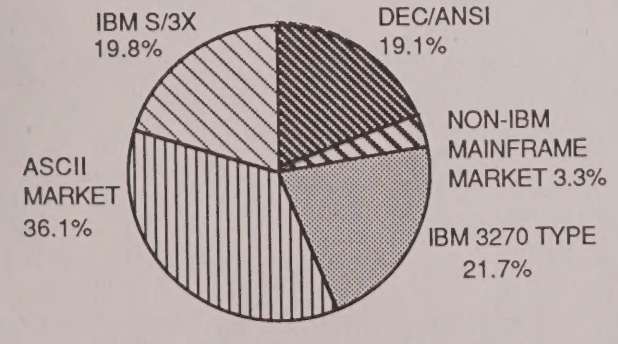

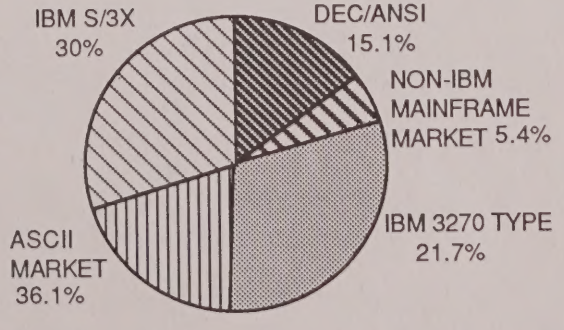

3.728 ~~BILLION~~ million SEE VOL 21 #18 P.8

$3.192 BILLION

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• CONVERGENT TECH AND 3COM CONVERGE. Now that Convergent Tech has finally turned the corner back into profitability (net income of $6.4 million for the year to date is not bad for 1985, and spectacular compared to its $2 million loss for the same period last year), it has pulled off a coup with news of a proposed stock merger with communications-expert 3Com. The deal would mean it can offer a hardware/networking package to OEMs like Burroughs (AT&T probably wouldn't admit that it could use one). What 3Com gains is less clear. Its 27% share of the pooling of interests reflects current stock value, but not recent history and immediate prospects. Possibly it felt it needed help as networking competition heats up in the wake of IBM's token-ring announcement. Convergent's Paul Ely will head the as-yet-unnamed combo if it clears all hurdles.

• JAPANESE CONNECTION FOR SPERRY. Trilogy has set lower goals, Encore's white horse is mud-splattered and looking for other stables, and AI investment is at least half a decade away from offering a possible competitive edge. So Sperry has hooked up with Hitachi for large-scale technological innovations.

• DECIPHERING CIPHER DATA'S 1/2" PLANS. After months of rumors about the agreement between Cipher Data and IBM, Cipher Data has confirmed that next year it will begin offering half-inch, single-reel, high-performance (200MB range), moving-head tape cartridge drives using IBM 3480 media in a 5.25" form factor. Because Cipher's first-generation product will probably not be compatible with existing 3480 drives, users over the short run will have to make a considerable investment simply for more commodious backup. Quarter-inch cartridge vendors say that the gradually increasing capacity of their drives and the security of a well-established standard will protect their share of the tape market. However, demand has been strong from small-scale system vendors like IBM, Nixdorf, NCR, AT&T, and TI for reliable backup between optimal quarter-inch capacities and 3480 storage. Moreover, later Cipher systems will presumably be able to read 3480 data, and by then the Cipher-IBM drive will almost certainly have been blessed as the standard of the future for small-scale systems.

• TANDON REPOSITIONS. After losing its ITC case, Tandon is shrugging off the floppy market. Current plans "involve greater concentration on private label production of complete microcomputer systems and on retail marketing of Tandon brand name disk drive products for upgrading memory storage capacity of existing personal computers." More eloquently, it has lured the operations/manufacturing chief from IBM's Boca Raton plant as its new president.

• CHEAP KISS. QMS's KISS laser printer will sell for $1,995, a full $1,000 less than anything now retailing. With price cuts by Apple at the high end of the PC laser printer market, and QMS and others establishing new price points for entry-level NIPs, expect HP to respond on LaserJet pricing.

• WINDOWS OPENING. Microsoft took the best possible tack at Comdex in spreading the news that Windows was at last shipping: it laughed at itself.

• SOFTCOREWARE. Intracourse, The Computer Program for Sex, has received a sisterly pat from Dr. Joyce Brothers, is written by the kind of people who think "personalogical" is a word, and currently runs on IBM and compatible, extremely personal computers. Readers must look elsewhere for other information. EDP/IR believes in making its own jokes.

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EDP industry report

● THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"The Gray Sheet"

D.C.BELLOMY, ASSOC.ED. NOV. 22, 1985 ● VOL.21, NO.14 P.J.MCGOVERN, PUBLISHER

IDC INTERNATIONAL DATA CORPORATION

JAPANESE COMPUTER EXPORTS TO U.S.: STILL NO TSUNAMI, BUT THE WATER IS RISING

Tsunami means tidal wave, and is the kind of metaphor that American industrialists and politicians have recently been applying to the influx of Japanese goods. In consumer electronics, in segments of the automobile industry, in basic industries like steel and sophisticated R&D-driven ventures like semiconductors, Japanese companies have been rolling over the American-based competition. With the U.S. computer industry mired for almost a year now in the slowdown slough, anxious eyes have turned in its direction.

The good news for American companies is that there seems little immediate prospect of a dramatic improvement in the shares of computer hardware sales currently held by Japanese vendors. By-and-large, the Japanese are still reactive imitators, not technological innovators, in the information industry. The key innovations in hardware and software architecture have been made by and have mostly benefited American vendors.

The bad news is that the Japanese are slowly but steadily gaining larger shares of American computer industry sales. Most of the increases have been in peripherals, not processors; however, the seismic changes in semiconductor manufacturing may provide the technological edge that can allow the Japanese to create future architectural revolutions, not just tag along in their wake.

After trying to chart the crosscurrents, EPD/IR feels that through the 1980s there will be a clear division of labor and division of spoils, as Japanese vendors increase their dominant role in printers and expand on their storage base, but American companies maintain their crucial edge in computers. CPU competition will probably heat up through the 1990s. For now, though:

- Japanese vendors accounted for 13.8% of the value of U.S. computer and peripheral hardware sales in 1984, up from around 11% in 1983.
- The $5.2 billion represented by the 1984 figure includes a significant fraction (up to a third) that stays with U.S. distributors.
- Of this total, 20.6% ($1.1 billion) came from computer system sales.
- The lion's share of the $5.2 billion was divided fairly evenly between OEMed storage products and printers ($2.0 and 2.1 billion).

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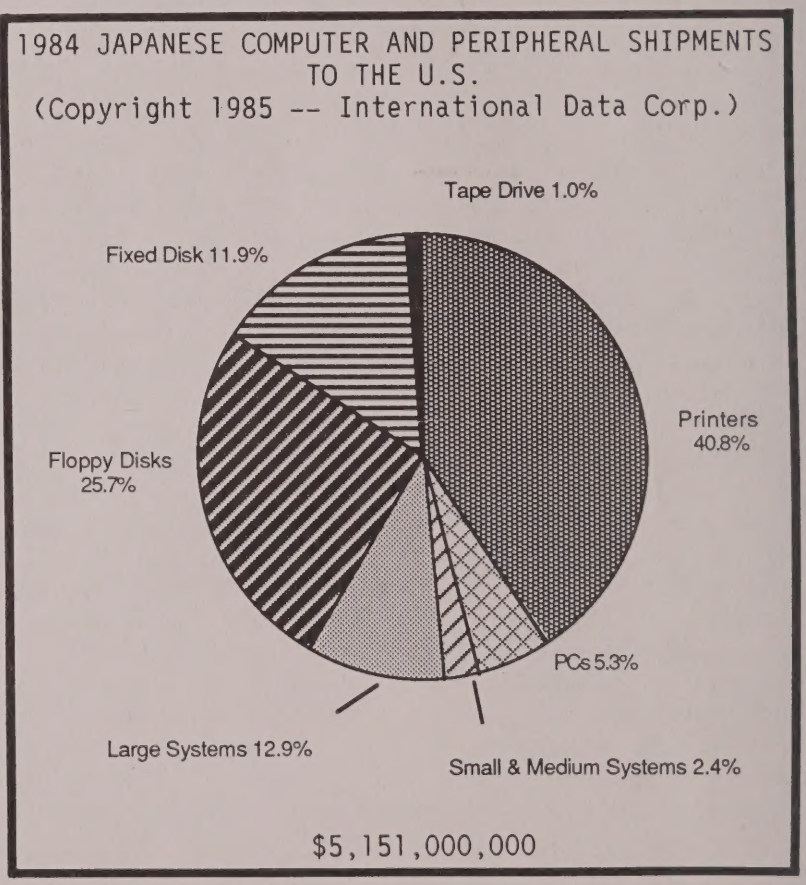
Japanese Computer Manufacturers Breathe a Little Easier Only on the Heights

The $1.061 billion culled by Japanese computer manufacturers from the American market does not fit many stereotypes. The popular image of their technological inroads revolves around miniature radios and subcompact cars. In computers, though, the only real successes so far have been with large mainframes.

Japanese-built PCs, the market segment most closely resembling the cliches about Japanese market penetration, are indeed in second place for the share they have attained of U.S. sales, but a distant second place. The Japanese percentage share of unit U.S. large-scale system shipments is over four times as large as its proportion of unit PC shipments.

Large-Scale Systems. If Clara Peller ever wonders where the beef teriyaki is, for computers it's right here. Japanese technology accounted for 240 U.S. large-scale system sales in 1984, 10.7% of the total shipped to U.S. users, for 7.4% of the $9 billion this market accounted for. Altogether large-scale sales in 1984 accounted for a little shy of two-thirds of the value of Japanese computer systems shipped to the U.S.



The Japanese entry point occurred when American PCMs could no longer keep up with IBM's rapid changes in architecture. Only corporate behemoths with all three of the principal prerequisites -- huge R&D investment funds, technological expertise, and mentalities geared to the cost-efficient production allowing the PCMs to undersell IBM -- could continue to compete.

The only companies with that combination of gifts happened to be in Japan. The two conglomerates that have to date accounted for all Japanese large-scale system shipments to the U.S. are Hitachi, which uses NAS as its U.S. distributor, and Fujitsu, which owns a little under half of Amdahl.

Different arrangements trigger different levels of U.S. involvement. NAS might send some specs to Japan, but Hitachi designs and builds the machines. Amdahl, which is sent "mainframe subassemblies," not CPUs, by Fujitsu, is much more intimately involved in system design and manufacturing. However, because Amdahl would likely lack the capital and technology to keep up without its Fujitsu link, all Amdahl system sales have been included in this overview.

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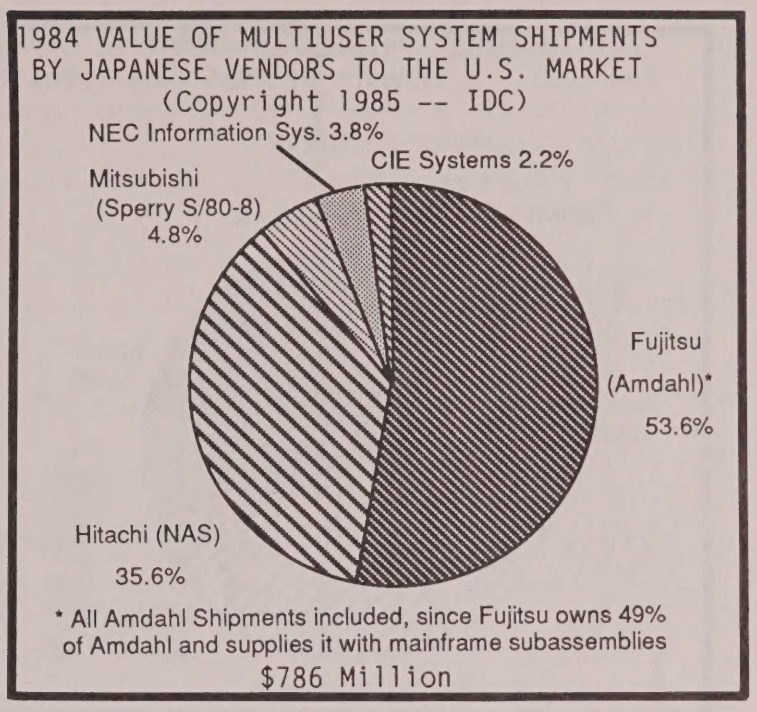
The current vendor shares between Amdahl and NAS could shift some over the next few years, especially if Amdahl doesn't improve its scheduled ship dates for its new Sierra-class machines. Otherwise the only overall change of note will likely be the introduction of other Japanese players on the scene. For example, Honeywell's new DPS-90 family of Sierra-class computers has been built around NEC CPUs.

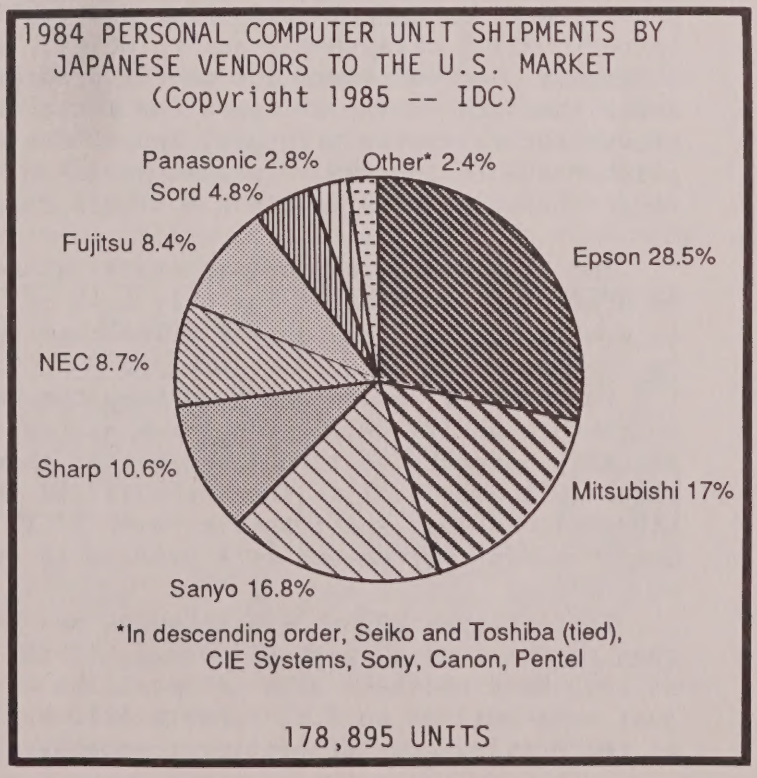


New players, then, not more total sales by the two already in the game, will explain what gain in market share accrues to Japanese vendors for the immediate future, probably not more than a percentage point or two. But by the 1990s, advances in chip technology by the Japanese giants could give them considerably more leverage.

Medium- and Small-Scale Systems. To the Japanese, these are still essentially terra incognita. In neither did they attain even 1% of the value of 1984 shipments. The only medium-scale presence is by Hitachi-NAS. Small-scale shipments came from three vendors, CIE, NEC, and Mitsubishi, but only the last-named, manufacturer of Sperry's S/80-8, has been showing much forward movement. The rapidly changing technology in these two sectors, focusing on supermicros and multiprocessors, will probably keep the Japanese locked out for some time.

Personal Computers. In 1984 Japanese PC shipments amounted to less than 3% of unit shipments and just over 2% of the dollar value rung up in U.S. corporations, homes, and schools. Considering the Japanese passion for PCs, one might expect otherwise. But there are reasons why PCs are not going the way of TVs and VCRs.

The most important is that TVs and VCRs are home commodities, while PCs are not really commodities and have lost their home base. When the home/hobby market begins to rise from the ashes, probably in the 1989-90 timeframe, the Japanese market share for PCs may rise with it. But to do so Japanese vendors will have to pay more attention to the PC-DOS standard than they have in the past.



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1984 UNIT PRINTER SHIPMENTS BY JAPANESE VENDORS TO THE U.S. MARKET
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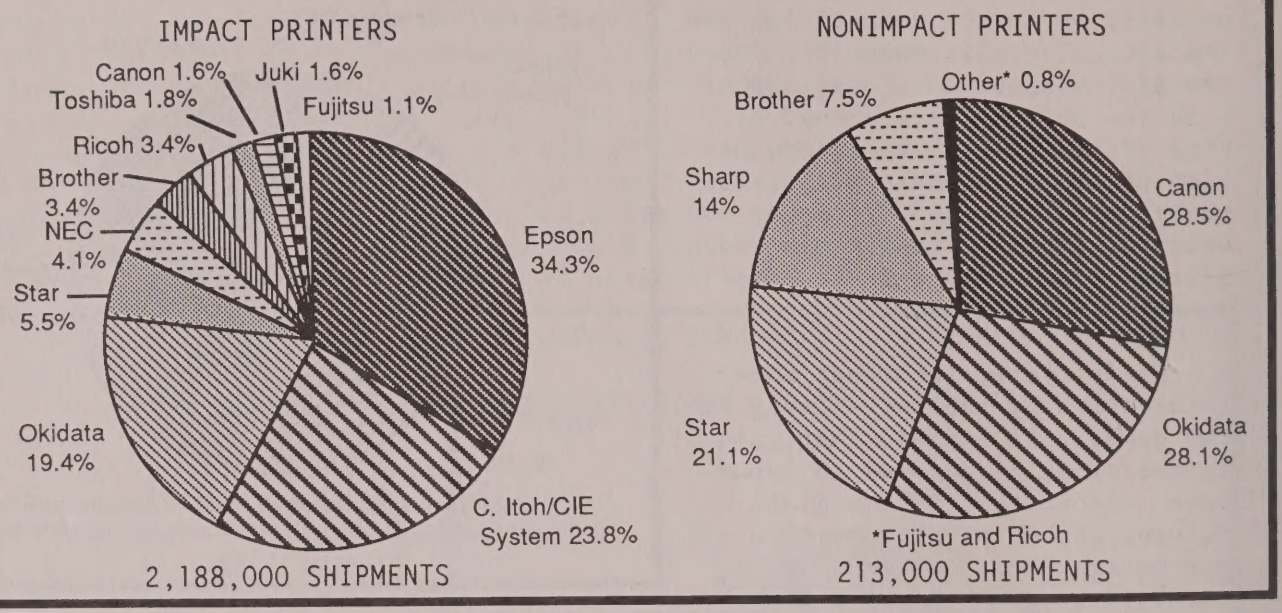

Peripheral Centrality for the Japanese

Printers. Japanese OEM/retail printer vendors have penetrated furthest into any segment of the U.S. computer and peripherals market, with 2,401,700 1984 shipments accounting for 57.4% of total U.S. unit sales. Because the overwhelming majority of these printers have been for PCs, the Japanese share of 1984 printer revenue has been less overwhelming at 36% or $2.1 billion.

The original impact of the Japanese was in the impact segment, where inexpensive dot matrix printers offered a viable if often blurry alternative to letter-quality daisywheels and thimbles. Virtually all of Epson's 750,000 shipments last year were dot matrix printers. However, Japanese vendors are aware that the demand of users for letter-quality print will fuel continued growth for character printers; Epson, for example, added two daisywheels to its printer stable in 1985. In 1984 Japanese vendors shipped 58.6% of the serial impact printers sold in the U.S. This figure will probably continue to rise.

The line impact segment is still an American preserve, with two Japanese manufacturers accounting for only 6.4% of U.S. shipments in 1984. The enclave is small, however, and sports price tags too costly to attract the Japanese.

What has attracted them has been the development of nonimpact printing, which through 1990 will grow twice as fast in unit sales as impact (25.9% annually compared to 12.6%) and better than three times as fast in shipment value (21% over 6.5%). The Japanese led the serial nonimpact subcategory (thermal, inkjet, and transfer) with 57.1% of 1984 shipments, mostly at the low-cost high-volume end (the Okimate 10 typically costs under $200).

Their biggest score yet, though, has been a 75.6% share of the nonimpact page market (i.e., laser printers). Their cut of the take is only around 25%, as they have not been able to establish their own distribution channels and just send engines to U.S. vendors like H-P, Apple, and QMS. But their position at the cutting edge of printer technology bodes well for future profits.

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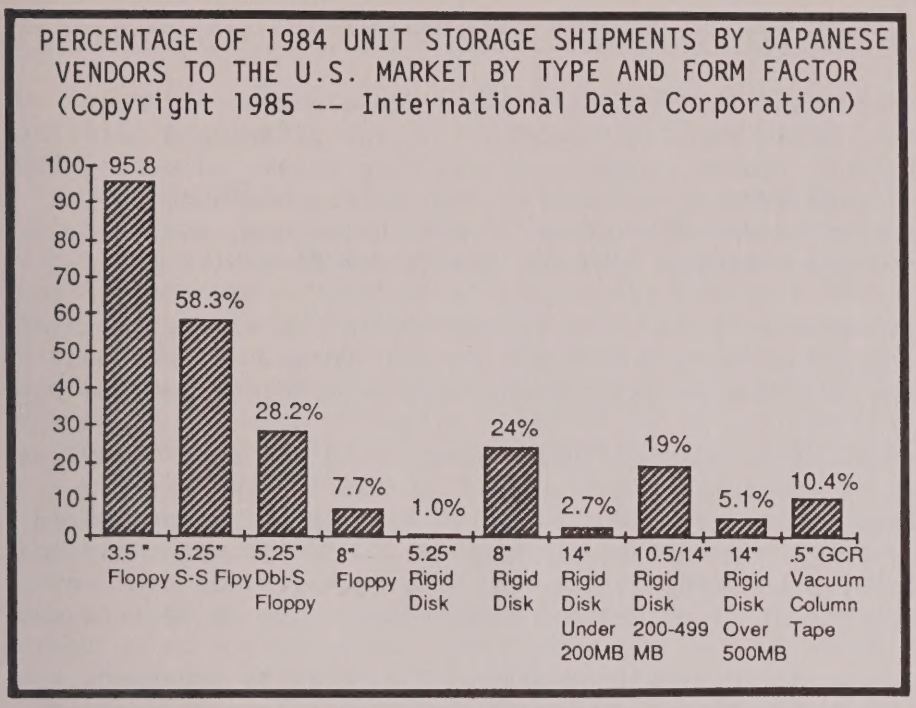

Storage. So far this sector has been a classic Harvard Business School case study of Japanese marketing: control the small end, then gradually add more and more high-end products until overall dominance is achieved.

In floppies, it's all over but the shouting. The Japanese have leveraged productivity and aggressive pricing into the level of control of 5.25" floppies (not yet fully evident in 1984) that will allow them to stay dominant in 3.5" disks as that form factor establishes itself.

In medium- and high-capacity rigid disks, Japanese manufacturers now have a chance to increase market share significantly after their success in knocking CDC out of its historic role as an across-the-board storage provider. Users like that kind of security, which is now replaced by many niches and few obvious long-term winners. If the Japanese giants can convince customers that they can do all that CDC did and more, small U.S. vendors could begin to feel real pressure. IDC analysts point to high-capacity 5.25", 8", and 9/10.5" disks as opportunities for the Japanese, as well as 1/2" cartridge tape products.

Caveant emptor et mercator. Not that it would assuage vendors affected by Japanese imports, but market domination looks very different according to how you define the market. If chips are added in, tsunami might be the right metaphor after all. Nevertheless, the $2.7 billion earned by IBM Japan from Japanese users in its most recent fiscal year is two and a half times what U.S. users were paying for Japanese computer systems. Also, bear in mind that 80% of the software used in Japanese systems is imported, mostly from the U.S.

Foreign competition is ruining American industry like steel,
shoes, cars, motorcycles, and textiles.
In fact, soon we'll be left with only one basic industry that we still lead the world in:...
complaining.
MACNELLY
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EDP/IR is indebted for market definitions and data to a new report, Japanese Vendors in the U.S. Computer Market, available from IDC for $995.

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TI ON AI: THE NEW EFFICIENCY EXPERTS SPEAK

On November 13 Texas Instruments inadvertently presented a strong argument against President Reagan's "Star Wars" initiative. It was offering a satellite symposium on artificial intelligence, supposedly the open sesame unlocking SDI, but had numerous difficulties beaming the tapes. The Boston audience at one point saw George C. Scott as Patton flickering across the screen, and later heard concupiscent whines and whispers from the soundtrack of a blue movie.

What the symposium succeeded best at was its demonstration of the depth of commercial interest in expert systems, the day's primary focus. TI claimed that 476 downlink sites were communicating to approximately 30,000 people.

An expert system is either artificial intelligence with low creativity, or a savvy database management program. Usually rules of the if-then variety have been interjected into the program that allow it to suggest actions based on the data. The most interesting part of the day was a discussion of current and projected applications, some using TI hardware and software and some not, that indicated how the potential of expert systems is beginning to be realized.

The applications discussed, running from around 200 rules to thousands, were typically shortcuts to save time and payroll expenses (although some of the most interesting systems to date have been in the field of medical diagnosis, the seminar focus was on more broadly relevant uses). Digital's XCON/R1 program, developed at Carnegie-Mellon back in 1979-80 to conserve manhours on semicustomized configurations, was a pioneer in the production use of expert systems. Starting with 250 rules for the VAX 780, the program expanded along with the product line. It has configured 100,000+ orders at an accuracy rate of 95%, lower than what the best experts can do but higher than the average.

Pleased with its initial expert systems experiment, Digital is helping fund other projects. One that has reached fruition is Dispatcher, which takes the place of workers with index cards to route LSI circuit boards for 8600s.

A much simpler program designed by TI for Campbell Soup dealt with impending retirements among the experts diagnosing problems in its seven-story pressure cookers. Programs with 152 rules are now used at eight sites for training and for quick response during emergencies or when human experts aren't around.

The still-evolving ISIS system was originally developed for Westinghouse by Carnegie-Mellon and is currently being fine-tuned on the shop floor to balance the many complex constraints during job shop scheduling.

A survey conducted by Mark S. Fox, director of the Intelligent Systems Laboratory at CMU's Robotics Institute and the creator of ISIS, found 68 manufacturing/engineering applications currently in the research stage, 38 more under development, 9 being field tested, and 14 in production use. The survey is another indication that expert systems are the latest version of the efficiency movement that first hit American manufacturing in the early 1900s.

Early efficiency experts in Britain and the U.S. played off fears of the industrial prowess of hyperefficient Germany; today's expert systems missionaries conjure images of Japanese manufacturing imports and AI investment for the Fifth Generation project. Expert systems won't be panaceas any more than stopwatches were, but, like other efficiency levers, they won't hurt either.

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VIEWING OPTICAL: A USER'S TALE

During the Seasoning Time in early American colonies, around a third of the new settlers would die. It is now Seasoning Time for optical disk storage.

The trailblazer among optical users has been the Library of Congress, which received the very first beta site and commercial products from the pioneering U.S. optical disk manufacturer (Alcatel Thompson Gigadisc) and system integrator (Integrated Automation). Librarians now hope that within weeks library users will be able to access the disks via terminals throughout the building. But few would be surprised if the date were postponed. In October an IDC storage analyst winged down to Washington to look at the system after two years of debugging and cost overruns. Shortly after the demonstration began, the system temporarily froze. Nor was this a solitary software bug.

Several major changes have been made in the Library of Congress system from the beta site model. For one thing, the original was a sluggard at retrieving data. A single mechanical arm picker (like the one on your record player, only slower) had to move among the 100 disks in the system "jukebox" (fifty 12" disks on each side of the turntable) to find the right data. The suction cup now in use is still slow by storage industry standards (one-to-five minutes for data retrieval), but positively precipitous compared to the arm picker.

Other issues involved the reliability and availability of the media. The original plastic media was dropped in favor of admittedly more fragile glass because gremlins were finding it all too easy to permeate the plastic. Then, media distribution was thwarted by limited supply and excessive demand. Thompson has now picked up its production pace and arranged second sourcing from 3M.

The 1-5 minute retrieval interval is not as serious a deterrant as it would be in other environments, not considering the alternative: stack searches by library runners can take up to three hours. Adding to the frustration is the fact that almost one out of three documents is not found on the shelves. In the long run, optical disk storage, coupled with inexpensive laser printers, will end the current bottleneck -- but getting to the long run will cost.

For some time to come the 70% success rate for physical retrieval will compare favorably to optical disk searches. Right now all 1984 indexes are on the system, but only 2-3% of the articles listed there. A project to file all incoming issues of twenty popular magazines is just getting off the ground. The problem is the transfer process, which is time-consuming and expensive.

Currently a manual DG scanner slowly reads, compresses, and transfers printed matter to a Priam 640MB Winchester, where the quality of images can be checked before transfer to optical. To save time a high-speed scanner has been purchased, and the Library will send some scanning work out to service bureaus at ten cents a page. That may sound cheap, but the November 11 issue of People would have cost $18.20 to scan, over 12 times the grocery counter price. Twenty such periodicals would cost the Library over $18,900 a year.

Participants in the Library of Congress Optical Disk Project believe that eventually their travails will have been worthwhile. But they also know that, if the delays and mounting expenses could have been foreseen, the project might never have been approved. Someday the pioneers will be honored. Right now they're gingerly fingering their scalps to make sure they're still there.

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• APOLLO ALLIANTSES. Trying to get out of its unaccustomed doldrums, or at least letting people know it wants to get going again, Apollo has recently announced a series of moves. A $3 million equity investment in Spectragraphics is aimed at developing direct access to IBM mainframes. The problem that the investment is aimed at correcting, the heavy use by Apollo's workstation users of IBM and Digital systems for major portions of their work, is also being addressed in another way. Apollo will be OEMing Alliant's FX/8 and FX/1 systems for integration into its Domain System for fileserving and compute-intensive applications. The FX/8 line, running from 4.45 to 35.6 MIPS, comprises one of the young parallel processor minisupercomputers. Finally, Apollo has "aligned" itself with a startup by one of its Founding Fathers, Bill Poduska, who has resigned from Apollo's Board of Directors and signed an agreement to hire away no more than six Apollonians over the next three years. Poduska's plan is to develop what could be called Cray-on-a-chip: workstations in the 20-30 MIPS range that will be compatible with the regular Apollo line. Apollo gets first crack to OEM or invest if it chooses, but for now there is no money, no risk, and no board chairman thinking like an entrepreneur rather than a marketer.

• CHIP WARS. The ITC has made an initial finding that Japanese EpROM pricing has hurt U.S. chip manufacturers, a necessary first step in the Intel-National Semi-Advanced Micro case against eight Japanese companies. However, the difficult questions have not yet been addressed. Besides, see below.

• FLOPPY FLAP FLIP-FLOP. Winning the preliminaries doesn't matter if you lose the only contest that matters. All rulings were in Tandon's favor in its ITC action against Mitsubishi, until Judge Sidney Harris ruled on November 5 that Mitsubishi had not infringed on Tandon's patent. Tandon says it will request a review by the full commission, but the issue is probably dead.

• CDC PERIPHERALS FIRE SALE. In its continuing effort to refocus corporate energy and capital, Control Data has sold its disk pack, tape, and floppy media business to Xidex for a pittance -- $55 to $75 million.

• ANOTHER DOUBLE-DENSITY DIP. Storage Technology has matched IBM's 10% price cut on its double-density 3380-class disk. Storage Tek's real problem isn't price, though, but rather availability.

• THE NEW TRILOGY. Now that its merger with Elxsi is finalized, Trilogy will have a triple focus: Elsxi multiprocessor systems; a development group working on chip circuit, packaging, and interconnect technologies; and a support center selling circuit design, CAE, mask-making, etc. A consolidated financial statement will not be prepared until this quarter. If there had been one for the third quarter combining Trilogy and Elxsi losses, net loss for the quarter would have been $12.5 million and for 1985 to date $26.3 million.

• SPERRY SPECTACULAR. As if the consolidation of manufacturing divisions and the merging of domestic and foreign sales were not evidence enough that Sperry is experimenting to find the best way out of the Great Softness, it has now announced a television blitz hitting corporate execs who happen to be Johnny Carson, Ted Koppel, O.J. Simpson, or Andy Rooney fans with 30 seconds of Kirk Douglas's chin dimpling around the words, "You know, a lot of people consider Sperry a safe choice. They don't know how right they are."

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IBM'S S/88, FAULT TOLERANCE, AND THE ALLURE OF TRANSACTION PROCESSING

Whoever thinks a faultless piece to see,
Thinks what ne'er was, nor is, nor e'er shall be.
-Alexander Pope

They'd blown it. They even admit that they'd blown it -- IBM had "underestimated" the market for high-availability horizontally expandable transaction processing (what others call "fault tolerance"). That is why IBM's System 88 is now scheduled for general availability in February 1986, a little over one year after IBM's unparalleled decision to OEM an entire computer line.

What Bluesmen describe as a "classic make/buy decision" crystallized in November 1984. IBM's annual survey of 75 of its largest customers had shown user interest in "high availability" increasing sharply in recent years, but presumably there had to be something more tangible to provide the final nudge. One clue might be the $8 million J.C. Penney contract that went to Tandem in February. Some say Stratus made the first move.

Once the decision to buy was made, IBM acted quickly. Competitive analysis of vendors was immediately initiated. Three Stratus boxes were being tested in IBM labs by December. On January 31 the two companies announced their new tie.

The suddenness of IBM's move is not really a function of the size of the fault-tolerant market. Although IBM doesn't like to ignore any niches, it had managed to leave this one well enough alone for about a decade. What matters now is that fault tolerance is increasingly seen as a necessary entry point into the larger, far more crucial transaction processing market:

- About 18.5% of U.S. multiuser systems are used for transaction processing applications.
- By increasing over 14% annually, shipments to meet this demand will more than double between 1984 and 1990 (53,000 to almost 120,000).
- Although fewer than 6% of these 1984 shipments were fault tolerant, the highest density segments of the transaction processing market are online and medium-scale (as are Stratus and Tandem).

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From Stratus to S/88: More Than Eight Coats of Blue Paint?

After the rush to establish the Stratus tie, IBM's S/88 stride has slowed. One explanation is that Stratus had to have time to prepare for increased production, but IBM is displaying a strong testudinal streak all its own.

Early Support shipments of the already well-established Stratus systems did not begin until April in the U.S. (six accounts) and in the U.K. until May (five more). "Limited Installation" was inaugurated in August, as IBM slowly sifted applicants to find sites (it has said only that fewer than 100 will have been involved) replicating the full gamut of possible fault-tolerant environments. Restrictions on orders ended with the general availability announcement on October 22, but the orders won't be filled before next February.

What has changed is not IBM's attitude but its problem. Had it become widely known that IBM was out shopping for a fault-tolerant partner, the news would have had the kind of impact on the market IBM likes to avoid. Hence, "If it were done when 'tis done, then 'twere well it were done quickly." But because the move had to be so abrupt, IBM now had three questions to mull over:

- Its lack of experience in catering to the special interests and requirements of fault-tolerant customers.
- The necessity to differentiate its S/88 offerings from Stratus's.
- The incompatibility of Stratus software with the smorgasbord of IBM operating systems, and the paucity of other meaningful ties.

IBM has pithily encapsulated all three in one succinct sentence: its chief goal is to convince people that "we're serious" about S/88.

The lack of experience shows in the "Limited Installation" program, which in effect has been functioning as a belated market research investment. Some might envy a situation where you get part of your potential customer base to apply to pay you money so that you can learn more about them, but IBM trades so on its reputation as a corporate security blanket that it was a risky experiment which the company would probably like to avoid in the future.

As for the differentiation from Stratus boxes, the October 22 announcement underscored the fact that for the immediate future, users will simply be asked to choose between Tweedledum and a somewhat pricier Tweedledee that has received the eight coats of paint it takes to create a Big Blue logo.

The three S/88 models will be equivalent to the basic three Stratus models: the S/88-20 (Stratus's FT 200), two sets of two Motorola 68000 processors; -40 (XA 400), with four duplexed 68010s; and -60 (XA 600), six doubled 68010s plus microprocessors for floating point and packed decimal functions. Prices will match model numbers -- the 20 will hit the $200K range, 40 $400K, and 60 $600K. IBM prices for individual parts of a system won't be that much higher than Stratus's, but IBM will be pushing costlier configurations than Stratus does.

One could go on. The S/88 Operating System is Stratus's VOS. The S/88 Transaction Processing Services (tools and utilities semi-integrated with the operating system) is Stratus's Transaction Processing Facility. Oracle, IBM's choice as a DBMS for S/88, replicates Stratus's offering.

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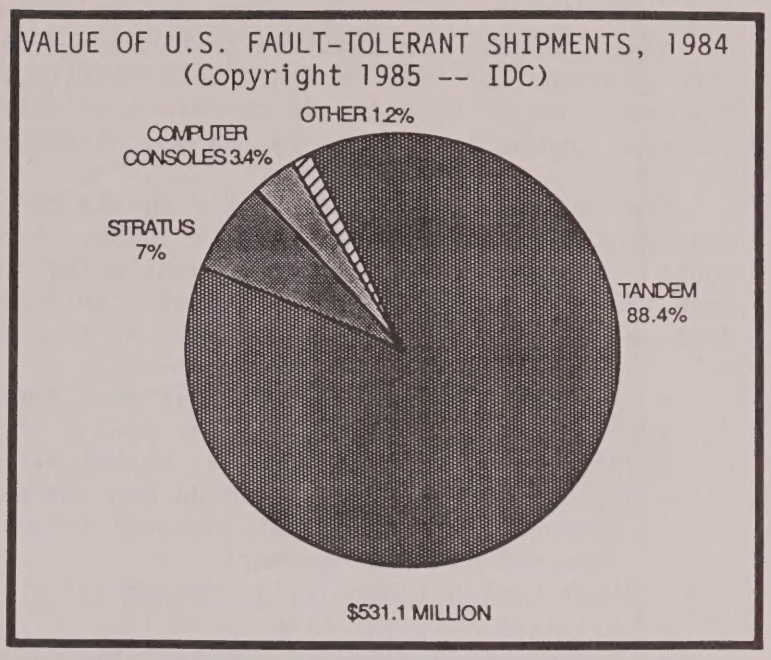
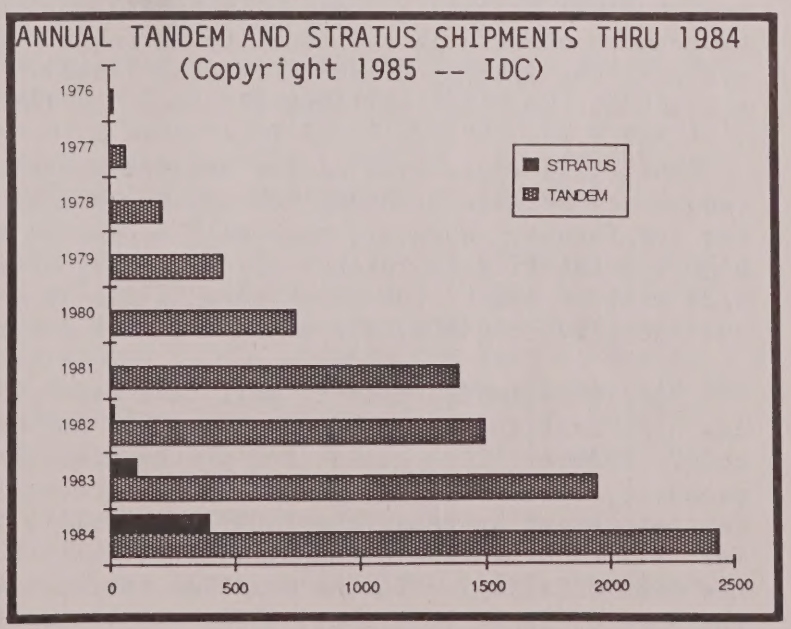
And so far the connectivity with the rest of the Big Blue ocean is no more than what Stratus has been offering. In the second quarter of 1986 S/88 will sport SNA-3270 terminal emulation with an SNA cluster controller program, which together will allow an S/88's ASCII terminal or PC workstation to appear to an IBM mainframe host as a 3278 display and to access application software in an SNA network. Stratus has offered essentially the same facilities since 1984.



IBM has tried to suggest that users will be getting sufficient value added in its reselling of Stratus systems by emphasizing service, support, and software development programs currently under way. The list of available applications will read like the Stratus software catalog for some time to come, but IBM has the leverage to beef up the list considerably. It will not, however, mount its own crash program to develop software, but will offer incentives and sidelines cheerleading to VARs and other third parties.

IBM has intimated that it was with the best interest of software developers in mind that it opted for Stratus systems in the first place. Stratus is associated with an all-hardware implementation of fault tolerance, while Tandem mixes hardware with software solutions. Although IBM's four-year-old charts indicated that only about 10% of system failures were due to hardware problems, it chose the method by which application developers would not have to take fault tolerance into consideration. Under normal circumstances, of course, IBM is not noted for its altruism towards suppliers or its uncomplicated software.

Because the S/88 operating system, like its VOS counterpart, will be incompatible with existing IBM software, IBM will have some explaining to do to users wary and weary of the proliferation of standards. However, the explanations may not prove too onerous if customers really want fault tolerance, for which the Stratus-S/88 operating system is specifically tailored. For example, it automatically resynchronizes components as they are returned to active duty while their duplicates continue processing. Incompatibility is the price of such specialization.



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Nevertheless, IBM realizes that users will demand more communicability in lieu of compatibility. The highest priority for S/88's overlords in the Systems Products Division is therefore to introduce the full panoply of IBM internal communications tools (SNADS, DISOSS, etc.) as soon as possible.

The onus is on IBM, especially considering fault-tolerant leader Tandem's excellent communication links with 308Xs. S/88's edge over similar systems would be purchasers predisposed to all-blue solutions, but they need reassurance that the new products will comfortably coexist with the rest of IBMdom if S/88 is to penetrate even a fraction of the markets targeted by its packagers:

- Finance (ATM, teller, international wire transfer, cash management)
- Retail (credit authorization, POS)
- Securities (trading systems, market data, OTC)
- Health (patient care, records and admission, laboratory)
- Transportation (reservations and ticketing, dispatching and transportation management)
- Distribution (especially inventory)
- Utilities (800 tollfree, E-mail)
- Government/Education (emergency dispatch, lottery)
- Media (printing, electronic publications, cable TV, videotext, ticket dispensing)
- Cross Industry (query/report writer, accounting, graphics)
- Manufacturing (shop floor, materials management, time and attendance, process control, SCADA, manufacturing management)

And yet many outside observers have been skeptical about IBM's long-term interest in S/88. The answer to IBM's intentions is premature, since its careful marketing experiments with S/88 indicate IBM's own confusions about the new line. What it will probably come down to is what you mean by long-term.

Tempering excessive optimism about the strategic role of S/88 is a broader IBM move towards high availability. The company got caught with its trousers somewhere around its ankles on fault-tolerant medium-scale systems, whether host-dependent or independent (i.e., Stratus/Tandem-type machines), and doesn't want to have to spring more OEM surprises on the world. The result is a crash program to offer high availability throughout IBM's small- and medium-scale systems (the Systems Product Division lines). One IBMer has referred to the project as the "highest focus I've seen at IBM" on a single attribute.

What this would mean as the project nears completion would be increasing redundancy between orthodox IBM systems and S/88, which would seem to bode ill for its future. However, much will depend on when particular products receive high availability features. S/1 allegedly already has some; probably S/36 and S/38 will be next. IBM would have little incentive to rush ahead with high availability on 4300s, a crucial area for overlap with S/88.

EDP/IR estimates that it will take about five years for SDP to round off its high availability project with 4300s and bring to an end S/88's special role. However, five years is a pretty good shelf life for any IBM hardware product. Moreover, S/88 could continue to sell in the niche market for truly fault-tolerant systems (the high availability IBM is planning would, if only for reasons of software compatibility, fall short of what a Stratus or Tandem has been offering). In the meantime, Stratus will have helped educate IBM in the ways of fault tolerance, OLTP, and transaction processing.

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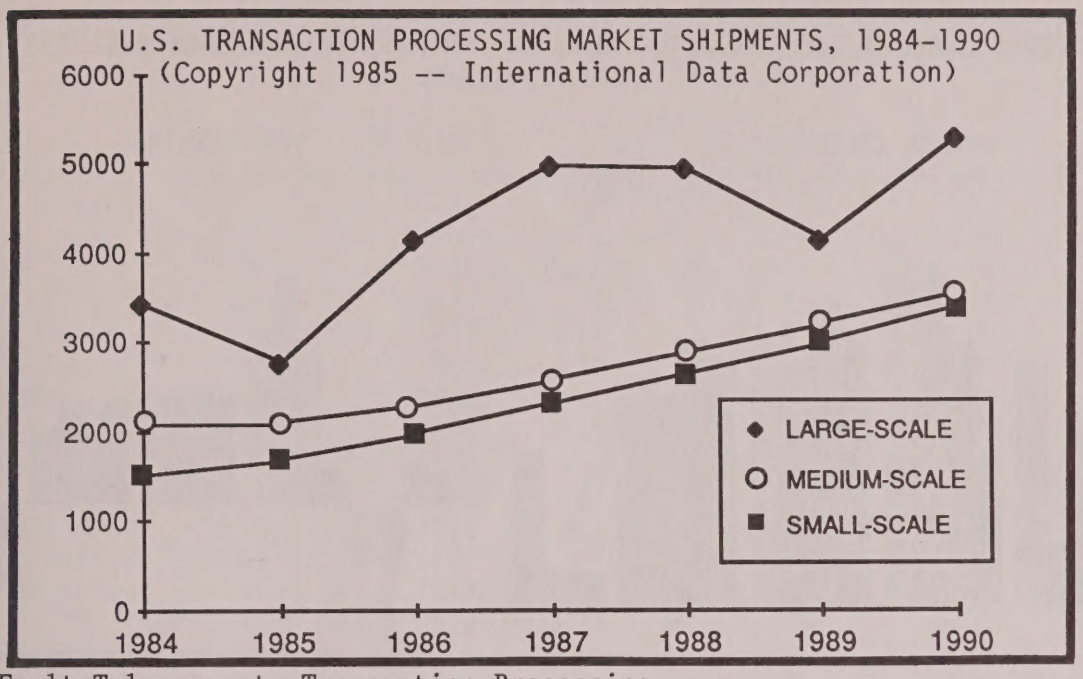

From Fault Tolerance to Transaction Processing

IDC notes that fault tolerance is not a market in its own right, or anyway not a very large or interesting one; rather, it is a feature of technological and psychological importance in the online transaction processing market.

Online transactions become of central importance below the mainframe level, where real-time activity is often blended with a comparatively high proportion of batch transaction processing and of computation not demanding database updates. IBM feels that with products like Fast Path, XRF, and CICS it has its large-scale OLTP bases pretty well covered. But most transaction processes in small- and medium-scale systems are online, and users want assurances that, as online applications become critical in their daily work, there will be as little disruption as possible, and that when computer failures do occur, they will not contaminate the database. At the very least they want high availability, and maybe true fault tolerance for particularly sensitive applications.

IBM was slow to recognize the relation between fault tolerance and OLTP. Stratus has been emphasizing its transaction orientation, while one startup, Tolerant Systems, reversed the usual procedure by first introducing a special OLTP system and promising a fault-tolerant one for later on. Significantly, it debated on whether to call itself Tolerant or Transaction Systems.

The most resounding claims have come from the undisputed champion of the fault tolerant field. Citing the definition of Tandem's intended market in its original Business Plan in 1974 ("the use of multiprocessing computers in on-line transaction-oriented applications"), the company has been stressing that "fault tolerance is only the beginning." Recently Tandem has been in the forefront of establishing benchmark definitions for the OLTP field, notably the measurement of Transactions Per Second by peak Debit/Credit transactions.

As the computer world goes online, the computer companies are getting in line to meet new needs. Fault tolerance brought Tandem and Stratus near the head of the line as it formed; as IBM has now demonstrated, other companies are learning from their example.

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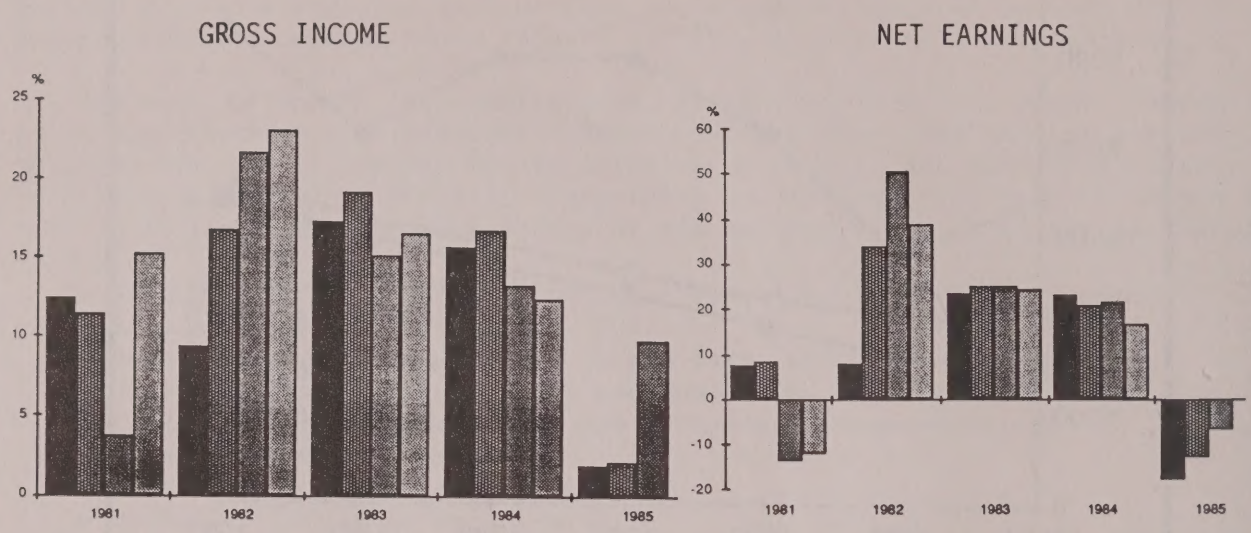
QUARTERLY CHANGES FROM PREVIOUS YEAR IN IBM REVENUE AND EARNINGS, 1981-3Q1985
(Source: IBM)



NO QUARTER AFTER THREE QUARTERS, BUT WORST PROBABLY OVER

The Great Softness of 1985 is far from over, even though third-quarter results suggest that, for many vendors, the worst may now be over. The other message they tell is that the climb back will be slow and often difficult.

IBM's quarterly report underscores the ambiguities in today's market. The slopes are all in the right direction; if each quarter in 1985 has seen lower earnings than its counterpart in 1984, the discrepancy has been gradually lessening. On the other hand, since the third quarter was blessed with the first Sierra and double-density 3380 shipments, plus a small-scale systems revival, the slope arguably should now be even better. Gross income was up only 2.3% over the second quarter, and net earnings only 4.2%. Sierra revenue streams have not yet refilled the reservoirs left dry as 308X money evaporated, while other gains were probably achieved only by pricetag pump-priming.

IBM's experience of revenue gains and net income drops is typical throughout the hardware segment of the industry. Nevertheless, a number of vendors can make the case that their earnings performance compared to 1984 is a misleading index of their true position and potential. Many 1984 earnings were artificially high due to last year's Tax Reform Act, which forgave 1984 income taxes on qualified DISC earnings. To take an admittedly extreme example, if you look at earnings before income taxes for Cray, the third quarter would be up 50.7% rather than down 2.5%.

Consequently industry sore spots are where revenue, not just income, is down. John Sculley may wish to interpret Apple's latest report as evidence that "it's working," that the Jobsless company is turning things around, but for this quarter sales were off 14.2%, pacing the 27.4% drop in net income.

The gloomiest news comes from companies that not only saw revenue and net income drop, but posted losses for the quarter. The chip manufacturers' predicament is notorious. Control Data's red ink rose higher than many had forecast. Apollo looked more like Icarus when it suffered an $18.5 million loss.

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SELECTED INFORMATION INDUSTRY FINANCIAL RESULTS, THIRD QUARTER 1985
(Source: Company Financial Reports)

Company	3Q 1985 Revenue $M	3Q 1984 Revenue $M	% Change	3Q 1985 Earnings $M	3Q 1984 Earnings $M	% Change
Altos	31.7	33.4	-5.1	2.3	3.8	-39.5
Amdahl	221.1	180.6	+22.4	5.7	11.2	-49.2
Apollo	55.2	57.4	-3.7	(18.5)	6.3	-
Apple	409.7	477.4	-14.2	22.4	30.8	-27.4
Britton Lee	7.1	6.3	+12.7	.4	1.4	-69.1
Burroughs	1,159.1	1,136.8	+2.0	32.2	50.2	-35.9
Cipher Data	35.2	41.4	-15.0	.7	3.9	-83.2
Compaq	131.7	87.5	+50.5	6.3	1.9	+234.0
CCI	25.4	33.3	-23.8	(4.2)	1.4	-
Computervision	105.8	137.1	-22.9	(20.7)	4.7	-
Control Data	1,228.6	1,244.1	-1.2	(255.6)	(54.5)	-
Convergent Tech	101.6	105.7	-3.8	3.7	2.7	+37.2
Cray	99.5	71.6	+38.9	19.1	19.6	-2.5
Data General	299.5	342.4	-12.5	.5	36.9	-98.6
Digital	1,623.9	1,515.3	+7.2	72.3	144.2	-49.9
EDS	921.9	239.0	+285.7	51.9	20.7	+150.7
Gould	361.6	390.3	-7.4	16.0	22.5	-28.9
Hewlett-Packard*	1,612.0	1,559.0	+3.4	117.0	134.0	-12.7
Honeywell	1,569.2	1,479.1	+6.1	55.7	93.3	-40.3
Intel	311.7	431.6	-27.8	(3.6)	70.0	-
IBM	11,698.0	10,657.0	+9.8	1,474.0	1,585.0	-7.0
Lee Data	23.0	22.3	+3.3	1.0	1.7	-40.0
Lotus	49.7	45.6	+8.9	6.4	9.1	-30.1
MSA	30.9	28.5	+8.4	(3.5)	(1.8)	-
Mentor	34.3	24.2	+41.6	1.4	2.4	-39.7
Miniscribe	28.6	26.1	+1.5	.3	(2.6)	+112.6
NCR	1,037.6	956.7	+8.5	71.7	96.9	-26.0
National Semi	423.4	529.0	-20.0	(53.5)	35.9	-
Priam	30.3	25.7	+18.1	.2	(.1)	+311.2
Prime	196.7	165.0	+19.2	15.2	21.9	-30.3
Quantum	29.1	30.1	-3.3	4.4	4.7	-6.3
Seagate	90.3	50.6	+78.4	1.7	(.4)	+496.3
Storage Tech	170.2	230.0	-26.0	(14.0)	(64.7)	+78.4
Stratus	21.1	11.1	+89.5	2.3	1.5	+48.9
Tandem	173.8	153.1	+13.5	11.1	21.6	-48.6
Ungermann-Bass	19.0	13.3	+42.8	1.3	1.8	-26.6
Wang	560.9	553.8	+1.3	7.0	51.2	-86.3
Sample Total	24,928.4	23,088.4	+8.0	1,630.6	2,369.1	-31.2

*For quarter ending July 31.

Fortunately, the inveterate optimist can scavenge some silver linings. A few vendors like Convergent Tech with nowhere to go after last year but up, went up. And then there are the companies on a seemingly unstoppable roll. Compaq continues to grow as if the Great Softness never were, while EDS helps explain why so many companies are looking longingly at services revenue. So far in 1985 its outside contracts are up 11.2%, but account for less than half of the $1.63 billion GM has paid it. In the third quarter EDS got over twice as much revenue as Apple, and better than three times as much as Data General.

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SELECTED INFORMATION INDUSTRY FINANCIAL RESULTS THROUGH THIRD QUARTER 1985
(Source: Company Financial Reports)

Company	1-3Q 1985 Revenue $M	1-3Q 1984 Revenue $M	% Change	1-3Q 1985 Earnings $M	1-3Q 1984 Earnings $M	% Change
Altos	96.2	95.2	+1.0	7.2	10.5	-31.3
Amdahl	604.8	552.0	+9.6	15.0	20.3	-26.2
Apollo	224.9	140.1	+60.6	(2.2)	15.6	-
Apple	1,220.0	1,199.6	+1.7	15.1	58.2	-74.0
Britton Lee	21.7	14.7	+47.1	2.5	2.6	-2.4
Burroughs	3,557.4	3,437.1	+3.5	132.9	150.5	-11.7
Cipher Data	115.6	104.0	+11.1	6.9	10.5	-33.9
Compaq	347.6	216.4	+60.7	16.6	6.0	+174.5
CCI	86.4	96.6	-10.6	(14.3)	5.5	-
Computervision	323.9	392.5	-17.5	(59.0)	26.5	-
Control Data	3,694.0	3,689.0	+.1	(269.6)	.6	-
Convergent Tech	295.3	246.3	+19.9	6.4	(1.9)	+429.1
Cray	295.4	157.9	+87.1	63.6	29.4	+116.5
Data General	1,005.2	920.5	+9.2	1.3	73.2	-98.2
Digital	4,598.6	4,121.8	+11.6	264.4	376.7	-29.8
EDS	2,366.2	666.7	+254.9	132.4	57.6	+130.0
Gould	1,065.9	1,146.4	-7.0	(110.6)	66.1	-
Hewlett-Packard*	3,289.0	3,078.0	+6.9	246.0	275.0	-10.5
Honeywell	4,596.5	4,324.1	+6.3	154.4	207.2	-25.5
Intel	1,047.0	1,213.2	-13.7	16.5	175.0	-90.6
IBM	32,901.0	31,441.0	+4.6	3,874.0	4,410.0	-12.2
Lee Data	66.0	77.3	-14.6	(3.0)	9.0	-
Lotus	153.7	106.5	+44.2	26.7	24.2	+10.3
MSA	94.0	85.4	+10.1	(3.2)	(3.0)	-
Mentor	100.1	57.2	+74.9	6.3	6.8	-7.4
Miniscribe	78.3	95.4	-18.0	(19.2)	1.2	-
NCR	2,911.9	2,817.0	+3.4	182.0	218.7	-16.8
National Semi	1,246.5	1,382.6	-9.8	(54.7)	75.8	-
Priam	84.4	76.8	+9.9	(11.6)	1.0	-
Prime	559.8	472.0	+18.6	40.3	44.9	-10.2
Quantum	96.2	77.4	+24.3	16.2	12.2	+33.0
Seagate	202.6	252.2	-19.7	4.1	20.8	-80.4
Storage Tech	504.8	656.6	-23.1	(59.7)	(86.3)	+30.8
Stratus	54.9	28.1	+95.4	5.7	3.9	+44.6
Tandem	464.5	406.3	+14.3	20.3	32.9	-38.1
Ungermann-Bass	49.6	36.8	+35.0	2.1	4.2	-50.1
Wang	1,748.8	1,811.1	-3.4	(85.0)	174.7	-
Sample Total	70,168.7	65,691.8	+6.8	4,566.8	6,516.1	-29.9

*Two quarters only for H-P (February-July).

So far over the first three quarters of 1985, the vendors EDP/IR has chosen to sample are up overall about 7% in revenue, and down 30% in income. These figures are comparable to 3Q results, except that average revenue is beginning to inch up. But the most intriguing statistic involves IBM's market share so far, which stays about the same in revenue (about 48%) but shoots up in net income from 68% to 85%. This is, of course, just a sample, and CDC's quarter-billion-dollar loss does erode the total. Still, when it comes to maintaining and expanding market domination, God bless the child that's got its own.

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EDP industry report

● THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"The Gray Sheet"

D.C.BELLOMY, ASSOC.ED. OCT. 28, 1985 ● VOL.21, NO.12 P.J.MCGOVERN, PUBLISHER

IDC INTERNATIONAL DATA CORPORATION

A TOKEN STEP: IBM TIPTOES TOWARDS THE LAN MINE

The good news is that IBM has scheduled initial shipment of the first installment of its token ring baseband local area network for first quarter 1986, six months prior to what had been its earliest forecast and a year and a half before its gloomiest. The bad news is that it could have waited.

That is to say, it could have waited as far as user need was concerned, since all that customers can get in the first quarter of 1986 will be a slightly glitzier PC Network that works on baseband rather than broadband. Sytek, which supplies the PC Network for IBM, can't be very happy with the initial implementation of the token ring LAN, since users can now get for a roughly comparable price (a little over $800 per workstation in an eight-PC configuration) somewhat more functionality than the PC Network offers.

- The token ring will run twice as fast (four megabits per second).
- It can connect more PCs -- up to 260 over IBM cabling, compared to 72 on a noncustomized PC Network.
- It can save cabling money through a twisted-pair option over existing telephone wires, which brings possible nodes down to 72 again.

On the other hand, people were expecting more differences than they will be getting, for a while at least. Over time IBM will try to differentiate the two LANS. The PC Network's role will be clarified through pricing (already the cost of its adapter has been cut to $645, so that it can be $50 cheaper than the token ring adapter card and diskette), and probably otherwise as well. Meanwhile the token ring will be opened to the rest of the Big Blue universe.

Already IBM is talking about connectivity. However, the key announcements will in fact run on both the PC Network and the token ring LAN:

- Both permit access to SNA mainframe resources by designating one PC to emulate a 3274 controller.
- Both offer access to the public network through a PBX.
- Both offer a gateway to Series/1.

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And that's about it. Because only PCs will as yet attach to the token ring, there is nothing for the S/36 or S/38 user desperate to communicate more effectively. There is not even the next-generation 3274 controller to support PCs and terminals simultaneously. All of this will come, but for now there is just another PC Network, and promises.

However, some promises are worth more than others. IBM has been talking about its LAN strategy for some time now, with broad promises of what it would be doing for its users. The key document was its Local Area Network Overview back on August 14, 1984; only slightly less important was its Office Systems Overview issued on October 25 a year ago. Probably the best way to look at its new announcements is to describe them as a higher level of promise, moving from lapidary verbiage to tangible products. In this context, certain aspects are probably more crucial than the particular form the announcement took:

- The TMS380 LAN chipset from Texas Instruments, a set of five ICs attaching a computer or peripheral to the IBM token ring, is ready. Orders are being taken for November delivery of a Design-in Accelerator Kit to allow customers to start designing for the token ring.

- Software vendors and users can plan their designs without worrying about yet another incompatible IBM standard. A $35 NETBIOS program will allow most software written to the PC Network's NETBIOS interface to run on the token ring.

- Users can take advantage of more sophisticated multiple-PC applications, and software suppliers can make money by meeting the demand, because IBM is making the peer-to-peer communications of LU 6.2 available on PCs through a new Advanced Program-to-Program Communications interface available in 2Q 1986.

These are promises that count for something. Forget about IBM's boast about coming in ahead of schedule on the token ring: you can still take the company's original projection at its gloomiest, and probably just about hit when users will get the kind of token ring they want. In all likelihood it will be another year and a half to two years before IBM announces desiderata like full SNA support. What the announcement of initial delivery of a token ring LAN for PCs really offers is something else:

- Physical evidence that a token ring with certain characteristics will actually exist.

- Lead time for third parties to write to the token ring specs.

These promises, moreover, could not wait much longer. Users were clamoring for guidance, while IBM's competitors were circling with alternative answers.

They got there first, if not with the most, at least with a lot. For example, there was little technological justification for IBM to reject Ethernet's approach to LANs. Perhaps Big Blue is right that token rings will be more effective for extensive communications with mainframes. However, it will be some time before IBM's token ring does much communicating with mainframes, and by then considerable improvements could have been made on Ethernet. The bottom line is that IBM wants its own network, not something handed down by Xerox and Digital. The latter has sold over 20,000 Ethernet licenses to date.

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WORLDWIDE MARKET SHARES OF INSTALLED LOCAL AREA NETWORKS, YEAREND 1984
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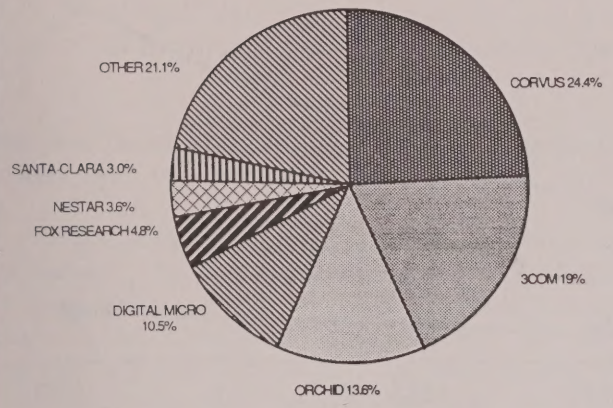
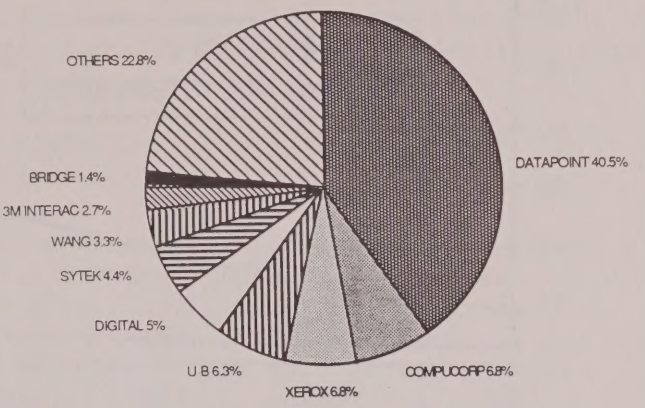
PC LANS



33,200 NETWORKS

TERMINAL/SYSTEM LANS



14,800 NETWORKS

Digital has recently announced what it calls its "second generation" Ethernet LAN, an intelligent hardware device to link up to eight Ethernet LANS serially in one megaLAN. Just as significantly, it paired the announcement with an enhancement of its SNA interconnect capabilities that allows MicroVAX computers to interface with an SNA network without a gateway or access to DECnet. The coupling symbolizes Digital's strategy of pushing Ethernet without discommoding the large installed base of IBM users that it wants to penetrate.

AT&T seems to want to repeat Digital's Ethernet success with its STARLAN network, scheduled to start shipping later this quarter. STARLAN's calling card was to have been user savings, not so much per connection ($700-800) as on how the connection was made: instead of expensive cabling, twisted pair telephone wire was to be all a user needed as a medium.

The twisted pair option on the token ring is widely regarded as IBM's riposte to AT&T. There is every reason to think that IBM would rather have customers shell out for cabling, but it would rather run its LAN on twisted pair than not at all. Also, if it controls twisted pair implementation, it still can have opportunities to lure users to cabling as they expand beyond 72 connections, or as they exhaust their telephone wiring, much of it old and noisy. Since in some buildings only about one-fifth of the existing telephone wire can be used in a reconfigured network, IBM would like to be looking over the user's shoulder when he realizes how much wire will have to be pulled to "save" money.

Both Digital and AT&T will talk about their LAN bridges to the IBM continent, as will any other hardware manufacturer offering a new network. However, users may suspect that the first priority of hardware vendors dabbling in networking is to protect their installed base. Certainly IBM runs into well-deserved doubts on that score whenever it starts bubbling about open systems. For that reason, and because they know how to lan at least as well as anyone else around, there will be a continuing role for the independent network vendors like 3Com and Ungermann-Bass.

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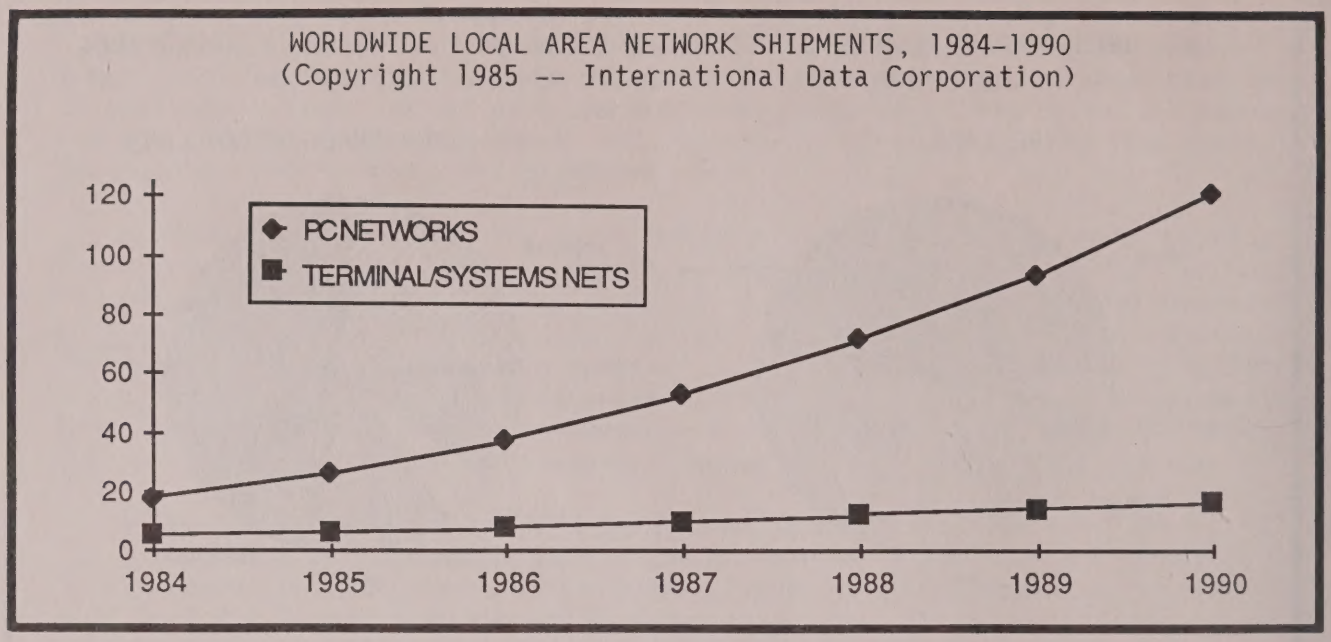

Nevertheless, the independents were understandably chary of IBM's monopolization of the news, and maybe the networking market, and had press releases ready to flash across the country as soon as word of the token ring was official. All promised to maintain compatibility with IBM; all promised to add value to IBM's offerings. For example, Ungermann-Bass emphasized a high-speed link between token rings to encompass more nodes, while Proteon is offering an IBM-compatible token-ring LAN of its own that can run on fiber optic cable.

All could have signed Ungermann-Bass's manifesto arguing that users implementing IBM's token ring "will still need to network non-IBM equipment, network IBM products for which an IBM networking solution is not readily available, or have value-added networking alternatives to the existing IBM solution." They are probably right, because IBM's primary concern is not to offer intervendor networking solutions based on developing international standards, but rather to create a new standard focused on interconnections between IBM systems.

IBM obviously doesn't want to be left behind in what is emerging as a high-growth segment of the information industry (it never does):

- The installed base of 48,000 LANs at yearend 1984 should swell at an annual growth rate of 49% through 1990, for a total of 500,000.
- Over ten million workstations will be connected to LANs by 1990, about 12% of all workstations installed worldwide.
- The dollar value just of LAN hardware should more than triple between 1984 to 1990, from $263 million to $800 million, even as the cost per connection of a LAN drops 16% annually.

But it needn't worry unduly. IBM's position is so dominant at the mainframe and PC levels, and so solid in between, that anything it proposed would automatically become a de facto international standard, as the independents have already proved. All IBM had to do was to give some bona fides of its commitment. Now that promise is met -- and the rest will be history.

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A LULL IN LOTUS-LAND SIGNALS MORE LANGOROUS GROWTH FOR SOFTWARE INDUSTRY

> Let us swear an oath, and keep it with an equal mind,
> In the hollow Lotos-land to live and lie reclined
> On the hills like Gods together, careless of mankind. . .
> Blight and famine, plague and earthquake, roaring deep and fiery sands,
> Clanging fights, and flaming towns, and sinking ships, and praying hands.
> -Tennyson, "The Lotos-Eaters"

Or so it used to seem, before clanging fights and praying hands came to Lotus Land and the rest of the software hemisphere.

The simultaneous rise to market domination by Lotus 1-2-3 and the IBM PC spawned a lot of commentary about whether hardware pushes software sales or vice-versa. What both sides are learning now is that whether either or both are right, the hardware market creates a ceiling on software revenues. And after a half decade during which the carpenters raised skyhigh the roofbeams, the ceiling will be distinctly lower through 1990. Moreover, the architects designing ceiling heights for hardware and software are increasingly the users.

Just as Lotus Development Corp. became the symbol of a voracious thirst for software, its current butterfly stomach can be viewed, at least in part, as a portent of future problems for software sales in general. In 1984, Lotus raked in a gargantuan 196% increase in revenue over 1983. During this Year of the Great Softness, however, the influx of new riches to Kapor and Manzi's Baghdad-on-the-Charles has grown sluggish. In its October 17 report on third quarter financial results, Lotus posted only an 8.9% increase in revenue compared to the same period last year. Even more traumatically, net income was down 30.1%.

No one vendor, of course, can truly symbolize an entire market segment. Still essentially a one-product vendor, Lotus doesn't have the revenue alternatives available to companies with a wider repertoire. On the other hand, it is not hurting as badly as some. Management Science America, after all, has had to defoliate Peachtree and announced a $3.5 million loss for the third quarter. Although net income at Lotus is up only 10.3% over the first nine months of 1985, revenue has gained 44.2%. This rise is far less spectacular than last year's astronautical ascent, but it is still better than the 35% growth achieved by the multiuser software industry as a whole during the halcyon days of 1984. Nevertheless, the lull at Lotus is emblematic of wider trends:

- After several years in which growth rates hovered in the 35% range, multiuse software revenue should increase by only 22% in 1985.

- Growth rates should pick up in 1986, but will remain below the pace set in recent years. The compound annual growth rate for the rest of the decade is projected at 27%.

- The major cause of lower growth rates will be a much more drastic slowdown in hardware sales. After a compound annual growth rate of 94.3% from 1980 through 1984, unit shipments of new computer systems will climb only 9.9% annually from 1984 through 1990.

- Besides the inevitable maturation of the hardware market, another reason for softer software sales is user insistence on tighter controls on information industry expenditures.

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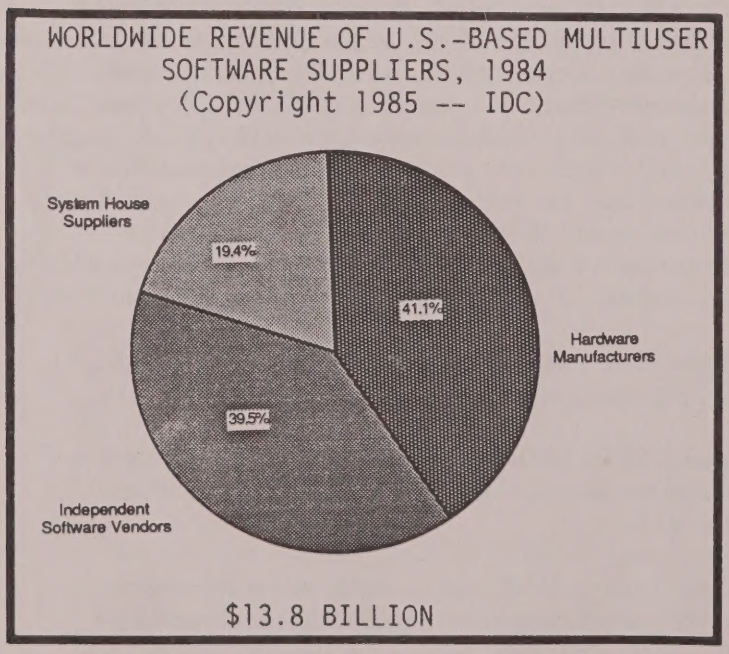
Trouble in Tahiti did not begin this summer. The move towards consolidation, so discernible in recent weeks with the definitive agreement for Ashton-Tate to take over Multimate and UCCEL's acquisition of Software Corporation of America, was already under way last year. The difference is that last year there seemed a simple contrast of big winners and losers. This year, software vendors are beginning to realize that winners may have to go in with other winners to keep from losing. After all, the MultiTate merger occurred between two companies that each doubled the previous year's earnings in 1984.

Lotus' management team apparently anticipated the downward direction the company and industry would begin to take -- it's just that the expedients chosen to alleviate the hardware and user resistance problems haven't worked, at least not yet. Although PCs are still moving, most seem to be going as additional machines at companies that already have a PC, ergo Lotus, presence. However much Lotus gripes, few customers will buy new programs for each new PC.

Moreover, it is becoming doubtful whether there will be much of a market for PC software anywhere outside of IBM compatibility. Lotus' decision to support the Macintosh with Jazz brought a quick cash infusion as current Mac users rushed to buy their copies, but then sales dwindled to a percentage of new buyers. Alas for Apple and Lotus, the dwindling is anorexic.

Then Lotus' plan to whip up new income from their installed base by introducing new releases hit an embarrassing snag last month with the recall of Symphony 1.1 after it was discovered that the new version could lose data when a user inserted or deleted rows and columns. The snafu overshadowed the news ten days later when Lotus shipped Release 2 of 1-2-3, or earlier this month when Lotus shipped Signal, a Dataspeed-developed market quotation product, in an effort to begin targeting new needs and developing different markets.



The Lotus lull will be seen in other companies as well, with the caveat that there will be differences between different types of software that will partially replicate the different growth rates for hardware classes. Software growth for large-scale systems will stay around 22%. Suppliers of PC software will see the greatest revenue growth (28% annually through 1990 for hardware manufacturers, 35% for independent software vendors, and 46% for systems house suppliers). Otherwise the division of spoils between types of suppliers will remain essentially unchanged.

Where new issues will be injected for software sales above the PC level is in the nature of user resistance. The PC problem is unwillingness to buy additional copies of a program; above the PC, the concern is increasingly with appropriateness for distributed processing and networked filing. Until users are satisfied with multivendor options, software vendors must step very gingerly.

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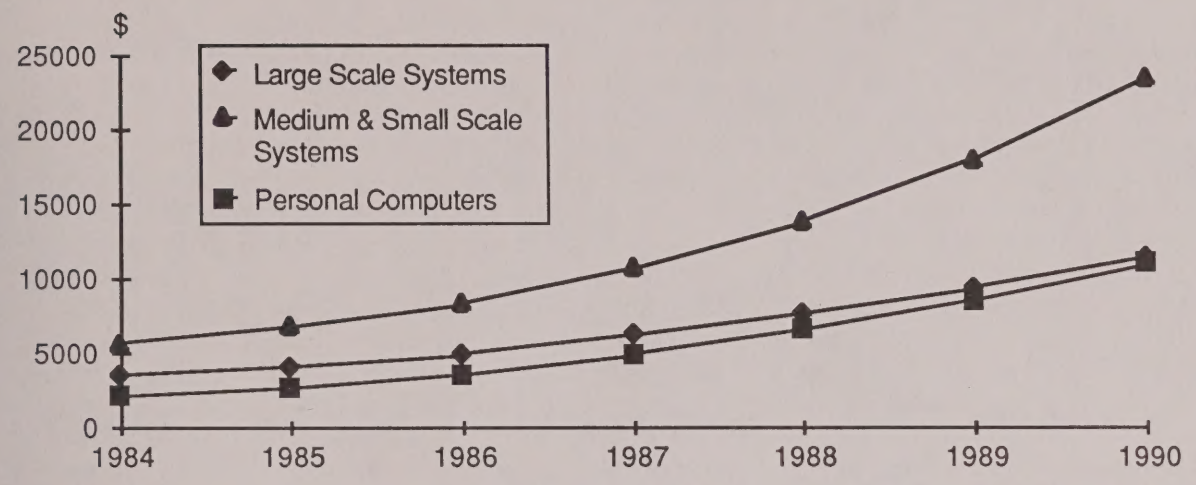
WORLDWIDE REVENUE OF U.S.-BASED PACKAGED SOFTWARE SUPPLIERS
BY HARDWARE CLASS, 1984-1990
(Copyright 1985 -- International Data Corporation)



In reaction to 1985's lower growth rates, software suppliers are grasping for new strategies. A number of companies, for example, are contemplating delving deeper into service and support. Many are emphasizing training; some are exploring professional services, notably customized software design. Actually custom software is expected to grow somewhat slower than packaged (around 18% p.a. through 1990), but the sector could provide a steadier, more continuous revenue stream.

The rub is that the field is already crowded, and will grow more so, with software companies contending with traditional professional services vendors and even hardware manufacturers looking for a little leverage (NCR, for instance, intends to increase its professional services presence). Software companies might have the advantage of appealing to their installed base as expert analysts, but would have the disadvantage of appearing inevitably biased.

Different strategies are emerging in response to buyer resistance, all of them price-related. Software suppliers typically address pricing concerns through how they merchandise a mix of products. Last year, they bragged about high-end, high-ticket offerings; this year, they talk about cheaper entry-level products. If they don't have such products, they are hastening to add them.

Alternative strategies are often dictated by users. Several suppliers are experimenting with non-copy-protected software. Others are going along with the demand by large users for site licensing. The largest software companies would desperately like to avoid either possibility, and are trying to negotiate volume discounts instead. However, MicroPro's announcement this month that it would incorporate site licensing may be an omen for other large micro software vendors. Users are holding all the aces.

And they will probably continue to. It is likely that this year's downturn marks a transfer of power from the software supplier to the end user.

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• AMDAHL'S TEN-MONTH BABY SIERRAS. At long last, Amdahl has joined NAS in the PCM world and Burroughs and Honeywell from the Bunch in offering a Sierra competitor for the American market. Three models will be involved: the 5890-200, 300, and 400. The first two will both be dual-processors, the former a slightly detuned (75% of the performance) version of the 300. The 200, it is said, will match IBM's 3090-200 in performance and beat it in price ($4.25 million for the minimum configuration); the 300 will offer better performance for a roughly comparable price ($5 million for the same configuration). Amdahl's quadratic 400 will allegedly run about a third faster in commercial applications than IBM's 400. According to Amdahl, these Sierra-class entries were designed and engineered in Sunnyvale, not the Land of the Rising Sun (pace NAS). Fujitsu's contribution to the new computers is reportedly "hard to pin-point, but not of a major nature," mostly at the component level. However, since most of the performance is generated at the component level, this may not be saying a great deal. But the real problem isn't whence the performance comes -- it's when. The announcement is so late because Amdahl wanted to "better evaluate the system" to insure reliability (how long testing has been going on, and when system design was completed, have not been announced). Even after all this testing, though, the 300 is not scheduled to ship until the second quarter of 1986, the 200 until 1Q 1987, and the 400 until 4Q 1987, a year after IBM's current timetable for 3090-400 delivery. There is some speculation that Amdahl can adjust these dates some. They'd better. Falling that far behind can be retrieved only if you've got George Brett on your team.

• INTEL 386. After months of show-and-tell to potential customers, Intel has formally announced the 80386 32-bit microprocessor. Intel people will acknowledge that at first they were concerned about being so late to reach the market, but since the market turns out not to have developed yet, they are now more sanguine. Their other concern has been the bad taste in customers' mouths left by the 286 delays. Intel learned its lesson, they say; 386 production at introduction is six months ahead of where the 286 was at the same stage.

• SEMI QUAVERS. With no end to the monetary hemorrhaging in the semicon-tor industry, United Technologies has pulled the plug on Mostek, which became the first significant casualty of the current crisis. Intel meanwhile has given up on dynamic RAMs. Financial crises have historically enabled the survivors to compete more effectively by paring waste; this crisis is slicing away the future competitive edge of American chips, and maybe more.

• BLUE MOVES. IBM has been backing-and-filling its pricing strategy to make the most of a comparatively bad year. For double-density 3380s, there is potential competition to be undercut, ergo price cuts. For proprietary large- and medium-scale software, there is no competition, presto 10% price jumps.

• AS COMPUTER MEMORIES TURNS. Exit the IBM contract for 20MB hard disks. Exit Irwin Rubin from day-to-day control of the company. Enter Finis F. Conner as new chairman and CEO. Four weeks later, exit Mr. Conner from the role of putative savior, reenter Mr. Rubin. Exeunt omnes, pursued by a bear.

• MOST ADVANCED DEVELOPMENT IN OFFICE AUTOMATION SINCE THE PC. That's how Insystec bills its integrated voice/data workstation (i.e., the E-mail can in-clude voice messages and text/voice files). We thought you'd like to know.

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EDP industry report

● THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"The Gray Sheet"

D.C.BELLOMY, ASSOC.ED. OCT. 9, 1985 ● VOL.21, NO.11 P.J.MCGOVERN, PUBLISHER

IDC INTERNATIONAL DATA CORPORATION

AND NOW FOR SOMETHING [IN]COMPLETELY DIFFERENT: SIERRA'S NEW VECTOR FACILITY SIGNALS CHANGES IN IBM'S LARGE-SCALE STRATEGY

IBM watchers include newsletter editors, consultants, investment analysts, even a few techies, but sometimes to really understand what's going on you need a numerologist on hand. The number 90, for example, seems to have a special meaning in Armonk: high-performance scientific computing.

The 7090, introduced back in 1959, was IBM's most resplendent triumph in this arena, as well as its last. With the move to 360 architecture, an effort was made to recover some of the 7090's glory with the 360-90, but to no avail. After the 370 line appeared, there seemed little interest on IBM's part to joust once more in a Fortran tournament with the CDCs and Seymour Crays of the world -- until now. The reentry vehicle, appropriately enough, is the 3090, which will receive a Vector Facility (VF) as of next February.

From the outset it has been clear that IBM wanted to penetrate the high-end scientific/engineering market with Sierra. The 3090-400, it was announced when the new family was introduced this past February, will run up to 50% faster in scientific and engineering environments than in commercial general-purpose applications. With Sierra's special E/S instruction set, high-speed multiply, loop control circuitry, and so on, IBM had, as EDP/IR put it at the time (Vol. 20, No. 20-21, February 28, 1985), "spared no expense to make Sierra the non-vector scientific computer of choice." Now the qualifying adjective can go.

The announcement of VF on the 3090 is significant for several reasons:

- IBM is showing that it respects both the size of the scientific market and its growing interpenetration with commercial processing.
- It will therefore pursue a more balanced large-scale strategy whereby each model will offer a combination of approaches to processing.
- VF marks the first giant step in the inevitable differentiation of the 3090 family from its 308X ancestors, which will not support it.
- IBM has signalled PCM competitors with their own vector facilities, established engineering vendors like CDC and Digital Equipment Co., and minisupercomputer startups that no niche is now safe.

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IBM IN BATTLE ARRAY

On page 6 of the last issue of EDP/IR (September 25, 1985), it was predicted that "an array processor could pop up on Sierra some time next year." After IBM's announcement on October 1, we can be a little more precise: the VF hardware will be available under MVS for 3090s in February 1986, with VM/HPO support following in the fourth quarter. The first VF unit costs $370,000, and the second $230,000.

For that money you get a cornucopia of new hardware and software. The VF hardware is an add-on frame attached directly to the 3090 that expands its footprint by 20% and consumes 10% more power. Because each engine in a 3090 can sustain one VF unit, the 3090-200 can support one or two, while the 3090-400 can fly with one, two, three, or four. Each VF unit contains three TCMs. The key software is 171 new instructions for vector processing. In addition, IBM is offering a vectorizing compiler, a 3838 emulation mode, and conversion aids to help nudge old Fortran 66, G1, and HX code up to Fortran 77.

More to the point, for that money you get striking price/performance. For what comes down to less than 10% more in overall system cost, IBM is offering customers who can take advantage of vector processing techniques between 1.5 and 3.0 times the performance on a nonvectorized Sierra.

The more balanced large-scale system strategy is an antibottleneck device. IDC has found that between 15 and 20% of the 308X base are heavy IBM Fortran users (i.e., users with a significant amount of scientific/engineering applications, many of them potentially vectorizable). With the increase in performance offered with Sierra, the percentage could grow significantly.

No computer can run faster than its slowest operations, which in IBM's terminology could be scalar (operations on single data items), vector (operations on ordered sets of scalars), or parallel (simultaneous execution of nondependent parts of an application). Scalar operations is the one area where no one has ever gainsaid IBM's strength. The first steps towards parallel processing were taken with the VS Fortran Multitasking Facility, available in December, which can divide certain Fortran programs among the two-to-four engines in multiprocessor 308X and 3090 systems. Now, with VF, 3090 users need not fear bottlenecks in vectorizable applications either.

This does not mean that the 3090 is being positioned as a state-of-the-art scientific computer the way that the 7090 was. The balance principle implies that there are trade-offs. Sierra is not designed to be a supercomputer a la a Cray machine. Applications that are 90% or more vectorizable will still run better on a system which in its totality is tuned to vectorizing instructions. For users specializing in these fields and able to afford them, supercomputers will remain the most efficient solution.

IBM has two aces up its sleeve. First is money. For users willing to forgo a supercomputer's extra megaflops, a 3090-200 or 400 with VF will offer sharply better cost/performance. Second is the range of vectorizable applications, running the scale from 95% of the code down to around 20%. Anyone in the 30-80% vicinity, IBM feels, can use VF cost-effectively. In all, it estimates that around half of its large-system users now run enough Fortran code on IBM and non-blue-hued systems to benefit from its new nonscalar technologies.

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EXAMPLES OF THE RANGE OF VECTORIZABLE APPLICATIONS
(Source: IBM)

Most Vectorizable	Least Vectorizable	Moderately Vectorizable
Seismic	CAD	Circuit Analysis
Structural Analysis	Linear Programming	Thermonuclear Modeling
Image Processing	Load Flow Analysis	Reservoir Modeling

Before VF can function effectively, however, Fortran itself must be manipulated to extract vector arrays. Enter IBM's vectorizing compiler, which, like similar compilers offered by Fujitsu, Convex, Alliant, et al., will perambulate through existing programs to mark off sections of the code that could benefit from an array processor. Less metaphorically, it will locate Do loops or other iterative processes and add call statements.

Moreover, program modifications will sometimes be necessary before the vectorizing compiler is let loose on the code. Some vendors claim that their compilers will handle virtually all Fortran code, while others concede that in a significant number of cases modifications must be made. Users will be the final judges, but IDC analysts are assuming that the compilers on the market now are not really that different from one another, and that some modification in complex unstructured code will be necessary before a vectorizing compiler can strut its stuff. If these assumptions hold, IBM's statement that modifications will be necessary for about 20-40% of the code in older, unstructured Fortran programs does not make its vectorizing compiler uncompetitive.

When all the modifications are made and the compiler has put vectorizable processes on call, most of the relevant applications will still be in traditional scientific/engineering fields. Many of the leading software vendors specializing there have already made agreements with IBM to incorporate 3090 VF applications. Boeing Computer Services, for example, will offer FIDAP and EASY5, engineering software for the simulation of complex physical systems, on VF as soon as it becomes generally available in February. Other VF vendors will include NASA (MSC Nastran), Structural Dynamics Research Corp. (CAEDS), Swanson Analysis Systems, Inc. (ANSYS), and IMSL, Inc. (IMSL Library).

IBM is also cognizant of the increasing overlap of applications developed for scientists and engineers with mainstream commercial processing. Techniques developed for certain compute-intensive operations like modeling are moving from the engineering designer's desk to the financial or actuarial planner's office. Also, there is a distinct possibility that new commercial uses will start appearing for VF and Fortran Multitasking customers. IBM, for example, foresees non-data-dependent applications such as payroll playing off both vector and parallel processing. Sorting has been mentioned by other vendors as a possible commercial application, but in this instance IBM is less sanguine.

Whatever applications develop, IBM can now be in on the ground floor -- and that is not good news for its competitors. Cray will maintain its supercomputer market, but will generate less interest among traditional mainframe users and could see dips in residual values. NAS and Amdahl will lose their vector advantage, and must clamber to incorporate those 171 new instructions to remain completely compatible. Digital must now deploy more forces to defend its scientific/engineering base against not only the besieging minisuper startups, but even IBM. And CDC has one more thing to worry about.

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PERFORMANCE PANDEMONIUM IN TECHNICAL PROCESSING

Commercial users entering the mysterious world of scientific/engineering computing with the 3090 may need some guidance on the chaotic performance standards by which technical processing is typically measured. The first thing to remember is that performance is much more application-dependent. IBM estimates that, whereas its own code (MVS, CICS, IMS, etc.) accounts for some 70% of the run time for commercial computing, that same 70% goes to the application code during technical computing. Hence all systems performance claims have to be taken cum grano salis when technical computing is under discussion, since the key variable determining run times is not the system but the application.

Then there's megaflops. If a user hopes for more precision as he leaves commercial processing ard the marshy world of MIPS, he'll have to think again. Megaflops (Millions of Floating Point Operations Per Second) can be just as mushy, since three different measures can be cited:

- Peak (maximum theoretical instruction rate given a fully loaded pipeline)
- Loop (fastest attainable speed for specific program loop)
- Job (time to run an actual real world job)

Each of these measures is legitimate, yet can differ by orders of magnitude. Peak performance is often in the 100-1000 MFLOPS range; loop data in the 10-100 MFLOPS range; while actual job speed is often less than 10 MFLOPS.

IBM prefers the third measure, job performance. Its new Vector Facility will allegedly improve most applicable jobs by an average of 1.5 - 3.0 times, but the progress can be more or less depending on applications. For those who want a peak rate, IBM says that a 3090-400 with four VF units can percolate at a peak 432 MFLOPS in 64-bit precision mode.

IBM Starts to Wean Potential Sierra Users From 308X Expectations

The availability of an array processor on Sierra is the most dramatic demarcation line yet drawn to differentiate the 3090 from 308X models. In one day, IBM showed the change in its 3090 strategy in three interrelated ways:

- The introduction of a significant new product (VF) only on Sierra.
- The change in general availability of the 3090-400, delivery of which is being moved up six months to fourth quarter 1986.
- Word that 3090 performance is running about 10% higher than initially announced.

In other words, IBM's short-term strategy to shore up 308X sales as long as possible hasn't worked much better than the expedients adopted in earlier mainframe transitions to stanch revenue bleeding until the new models are in full production. The current fall in large-system sales isn't as precipitous as it was during the 360 transition in 1965, when IBM shipped fewer than ten systems in the U.S., but it will prevent any growth in mainframe revenues in 1985.

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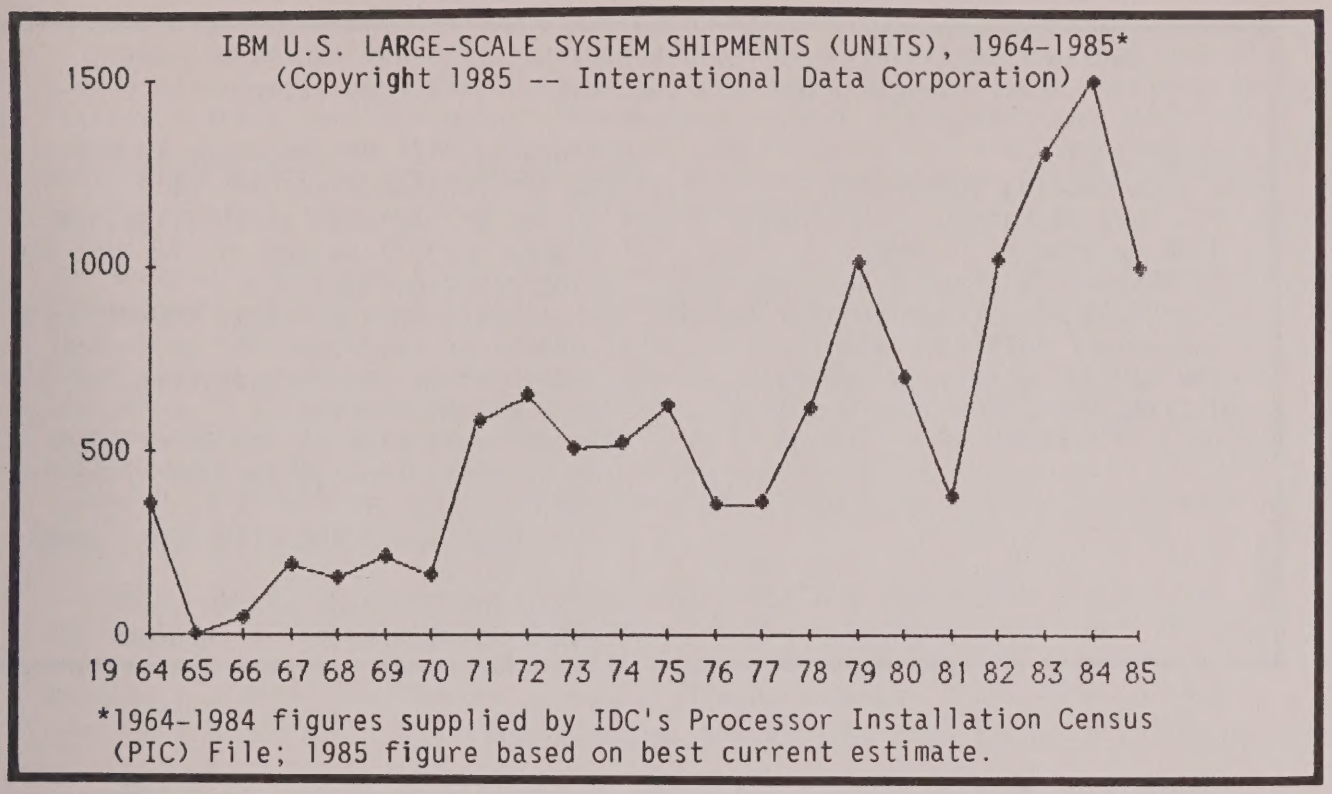
IBM U.S. LARGE-SCALE SYSTEM SHIPMENTS (UNITS), 1964-1985*
(Copyright 1985 -- International Data Corporation)
1500
1000
500
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19 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85
*1964-1984 figures supplied by IDC's Processor Installation Census (PIC) File; 1985 figure based on best current estimate.

IBM made nothing big out of the fact that the 3090-200 will actually run at around 30 MIPS rather than the 27 (equivalent to a 3084-QX) claimed originally, or that the 400 will therefore gallop at around 53 MIPS rather than 48-49. Nothing big, as yet. However, whenever IBM decides to lay the 308X line quietly to rest, it can start bragging about performance boosts above anything else IBM has ever offered, rather than reminding customers that they can get virtually identical performance on a 308X or 3090. Also, price/performance for a 3090-200 is now almost 20% (rather than 10-12%) better than for a 3084-QX.

The fact that IBM could move 3090-400 shipments up two quarters is not surprising. There had to be a considerable amount of slack in the delivery schedules, since there couldn't be that much involved in putting two dyadic 200s together, especially for a technologically proficient company with considerable expertise in quadratic systems. What is significant is that the company has already chosen to make the announcement.

Until the 10% misunderstanding was corrected, the most critical difference for most commercial users between a high-end 308X and a 3090-200 was that the latter could become a 400 and the former couldn't. If a customer had to wait until the second quarter of 1987 for those extra MIPS, maybe he could be enticed for the interim into another 308X upgrade, or even a new sale. Presumably IBM was hoping that enough users would take that route to soak up 308X inventories. All indices at IDC suggest that they are not, or they are going to the used market or short-term leases for 308Xs. IBM has less to lose, then, by moving up delivery dates, and could certainly accommodate big customers who want to work at 400 performance levels even before 4Q 1986.

With 308X sales stalled, there is no longer any incentive for IBM to stress the similarities between the old and the new. The word now is differences, as Sierra is selected as pointman for Big Blue's fall offensive.

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CURRENT SIMILARITIES AND DIFFERENCES BETWEEN 308X AND 3090 SYSTEMS
(Copyright 1985 -- International Data Corporation)

Similarities
- Liquid Cooling System
- TCM chip packaging technology
- 32MB maximum main memory
- 24 channels maximum
- 3.0MB/second maximum channel speed
- Support of full complement of IBM operating systems (MVS/370, MVS/XA, VS/SP HPO, etc.)

Differences (at Uniprocessor Level)
- No 3090 uniprocessor (as yet)
- No Vector Facility on 308X systems
- 8 MIPS on 308X engine vs. 15 MIPS on single-engine 3090
- Price/performance: $215,000/MIPS for 3084-QX vs. $177,000 for 3090-200
- 30% lower maintenance pricing for 3090 on a per-MIPS basis
- 24 ns cycle time vs. 18.5 for 3090
- No expanded storage in 308X, 64MB in 3090 systems
- 32KB high-speed cache in 308X, 64KB in 3090
- TTL chips in 308X, ECL in 3090
- 35% more MIPS/sq.ft. with 3090

Recycling History: IBM's Large-System Evolution

The list of differences between 308X and 3090 systems is already impressive and will grow longer over the next year, but the discontinuity should be placed in historical context. Sierra does not offer a major break such as occurs when IBM introduces a fundamentally new architecture, as it did with MVS-XA in 1980.

The portrayal of 3090s as an evolution from the 308X line rather than a revolution was not disingenuous. IBM obviously wanted to save as many 308X sales as possible, but in fact many of the changes involved in the 3090 move were already signalled with the design integration obvious in the 3080 X-models announced a year earlier. The level of continuity explains why IBM expected to continue selling 308Xs, and in fact has sold a decent if not impressive number, and why PCMs like NAS have been able to respond so quickly to Sierra.

The similarities between the systems are close enough that analysts at IDC expect IBM to repeat with Sierra many of the strategies they used during the piecemeal introduction of the 308X line, especially insofar as they made money (and almost everything involved with the 308X series made money).

Probably the most salient point of history to remember is that the real replacement for the 3033 did not appear until the 3083s popped up about two years after the first 308X (the 3081D) was shipped. At some point IBM will take the step of dividing the 3090-200 in two and offering a uniprocessor version (already known familiarly as the 100) that would be analogous to the 3083-JX. IDC suspects this will happen during the first half of 1986, with general availability following at some time in the second half.

This uniprocessor would be "fully tuned" -- i.e., it would offer all the features of a dyadic 3090-200 and hence should come in with half the MIPS, around 15. IDC analysts also anticipate that there will be at least one, and probably only one, "detuned" uniprocessor. Such a system would offer about half the MIPS on a 100 in return for a convenient entry point to start jogging on the 3090-compatible growth path. The analogy would be to the 3083-EX.

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Actually the 308X family produced two detuned offspring, but that bit of family planning seems to have been based on technological rather than market factors. There were two detuned processors because there were two different tuned versions of the 308X uniprocessor, one of which was the precursor of dyadic systems. Since there already is a dyadic 3090, there is no technological reason for different detuned uniprocessors.

Moreover, while marketers can make a strong case for one detuned processor, their case is almost as strong against having more than one. Beneath a half-speed 100, the 4300 line will have filled out all the available MIPS space. Above this hypothetical entry point, it is in IBM's best interest to stimulate big leaps in MIPS (and money), as in the migration from a 3090-100 to a 200, rather than smaller incremental jumps, say to a 10-12 MIPS, moderately detuned uniprocessor. It is probably in the best interest of users as well, since IBM large-scale customers are currently doubling their MIPS diets on an average of every two to two-and-a-half years.

The same reasoning would argue against a triadic 3090 situated between the 200 and 400. If users balk at jumping from 30 to 53 MIPS all at once in the most prodigious vault ever contemplated in commercial processing, IBM might introduce a 3090-300. However, current indications are that IBM's largest users are already flexing their muscles to leap the 20 MIPS onto the 400.

What will they be able to get if their performance requirements continue doubling every two years? They'll have 400s in the second half of 1986. Will there be an 800, an ocdatic processor offering 85-95 MIPS, available in the second half of 1988? Probably yes, if IBM's marketers have anything to say about it, but only maybe if you look in the labs. Getting an eight-processor complex to cooperate with an attractive degree of efficiency under a single current IBM operating system is arguably much more than twice as difficult as rigging up a quadratic system. If IBM can't manage an ocdatic 3090 by 1988, a hexadic 600 might be a good bet, but only if an 800 is not available.

Throughout this putative future development of the Sierra range of large-scale systems, IBM will continue to add new features, some of them shared with the 308X clan, some of them additional differentia between the two series. On the one hand, IBM will continue to increase the virtual machine performance of all its mainframes, not just the 3090s. But other improvements will be limited to Sierra, as either a marketing maneuver or a technological necessity.

The most significant difference other than the vector processor may turn out to be the expanded storage on a 3090. Faster channel speeds, which some erroneously expected Sierra to offer, would have been far less significant than the ability to reduce the number of start I/Os and thus avoid the channels in the first place. The difference will become truly dramatic if, as IDC expects, IBM quadruples expanded storage during the active shelf life of the 3090 line by substituting megabit chips for the 288Kb variety now in use.

Altogether, the differences will provide a basis for a possible quadrupling of optimum commercial performance by 1988-89, without radically changing the hardware or software. Transition to the next family of processors, usually referred to as Summit and projected for announcement in early 1989 and general availability in late 1989, may not be possible without another quantum leap. One possibility is significant modification in operating system design to facilitate simultaneous processing by up to 16 processors at over 250 MIPS.

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• MORE HARDWARE FROM BIG BLUE. Squeezed under the 3090 news came word of a 30MB hard disk AT, plus some memory and other enhancements on the 4361.

• AND SOFTWARE, TOO. Alongside the 3090 announcements IBM posted several additions and enhancements to its office automation software offerings. The introduction of DisplayWrite/370 now means that one word processing interface exists from Sierra down through S/36 to the PC. This is of more symbolic than immediate strategic importance, but symbolism can be strategy too. Also on the way is PROFS-DISOSS interaction, in which PROFS systems are accepted as DISOSS nodes, and a document management package for VSE users has been assembled.

• AT&T TOADSTOOLS? After noticing how much weight toadstools had to displace, Mark Twain mused, "Ten thousand toadstools, with the right purchase, could lift a man, I suppose. But what good would it do?" Power without clearly defined purpose doesn't do much good. To many observers, AT&T's forays to date into the computer market have mostly exemplified the Toadstool Principle, while its latest announcements are but partial exceptions at best. Ironically, the centerpiece turns out to be its new IBM clone, the PC 6300 Plus. The Olivetti-designed 6300, an XT copy, has finally begun to jell at the retail level just over the past few months. The AT&T-designed 6300 Plus supposedly is over twice as fast as the 6300 and 25% faster than the AT, and can at the touch of a key shift into Unix. Why you'd want to still elicits some stumbling by company spokespeople, but a party line is firming up around "communications services" as the right answer. Why, then, would someone want a Unix PC, the 7300, if Unix means multiuser and PC implies single user? Alloy's DOS coprocessor board, designated the DOS-73 by AT&T, will allow DOS programs to run on the 7300, but AT&T isn't pushing that solution. Instead it will be putting its advertising money behind the new 3B1. This is not an object-code-compatible addition to the 3B line of small- and medium-scale systems. Instead it is a 7300 with additional memory and faster access time, and therefore better placed for multiuser environments. Since the 7300 on its own has been selling like cold cakes, this may mark the beginning of the end of the Unix PC.

• NEW PRODUCTS, OLD TALES FROM INTEL. On the subject of the Toadstool Principle, few computer vendors have offered more and received less money and attention for their pains than Intel. Back in August it shipped its first iPSC parallel processors, 32-, 64-, and 128-processor systems running at peak from 2.5 to 10 MFLOPS for $150,000 to $500,000. However, because software compatibility is lacking with either DEC or Cray bases, future sales are mostly limited to a small number of universities and similar environments. Intel's latest marvel is a multiprocessing 80286 system that can allegedly run five rings around the VAX 11/780 -- if you happen to be running in Xenix.

• DUMPING ON ALLEGED CHIP DUMPING. 256K EpROMS have been chosen by Intel, Advanced Micro Devices, and National Semiconductor as the subject of a charge of dumping by Hitachi and other Japanese semiconductor vendors before the ITC.

• MICROVAX II, TAKE TWO. Accompanying a new CAD/CAM VAXStation and other MicroVAX II enhancements came word that 5,000 have been shipped since May.

• CDC LOWS. To get some money CDC is closing an MPI high-performance disk drive plant and selling Ticketron, practically its only profitable subsidiary.

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EDP industry report

● THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"The Gray Sheet"

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IDC INTERNATIONAL DATA CORPORATION

PROCESSING EDGES TOWARDS A PLURALISTIC UNIVERSE: NEW COMPUTER TECHNOLOGIES SEEM PORTENTS OF A REVOLT, NOT A REVOLUTION

The first parallel processor was Plutarch, the first-century Greco-Roman whose Parallel Lives presented pairs of Greek and Roman biographies from the age of semimythical heroes to his own time. He chose to illuminate the history of ancient Mediterranean culture not by accumulating sequential events, but rather by parallelizing similar character types and situations. The one advantage that Plutarch did not gain from his innovation was faster processing speed -- the compilation is said to have taken him some fifty years.

Or you could look at it that way. It certainly is no more far-fetched than some of the psychological/biological/cosmological metaphors that have barraged newspaper and magazine readers for the past couple of years. It is an insufficiently recognized fact that scientists, particularly those exploring the more exotic regions of mathematics, often have a romantic, even mystical vision of the world. When you put them together with hype-types from PR firms to explain the new technologies, the corn can get as high as an elephant's eye.

In the process adequate definitions have been slow in jelling. The distinction between multiprocessing and parallel processing has been especially murky. IDC analysts have been dividing up the new technologies as follows:

- Multiprocessing refers to systems where multiple processors handle multiple processes, but each process is handled by one and only one processor. Main memory can be either dedicated or shared. These systems are often referred to as MIMD (Multiple Instruction Multiple Data Stream) computers.

- Parallel processing refers to MIMD systems where more than one processor can work simultaneously on the same process, handling both vector and scalar instructions.

- Vector (or array) processing refers to systems where multiple processing elements can simultaneously apply a single instruction to arrays of floating point add and multiply data, but scalar data are handled serially. Often referred to as SIMD (Single Instruction Multiple Data Stream) systems, vector processors can also be viewed as a special subset of parallel processing.

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GLOSSING THE NEW TECHNOLOGIES

Besides the basic definitions of multi-, parallel, and vector processing, a number of distinctions have to be disentangled before the nature of the new processors can be appreciated. Key concepts include:

- Tight vs. Loose Coupling -- The former is usually associated with high speed CPU-CPU communications and (in many cases) shared memory. The latter is typified by the relatively discrete processing found in a Vaxcluster.

- Large vs. Fine Grain -- Granularity is correlated to the size of the "chunks" available for concurrent processing. On the software level, granularity can be at the application, program, task, subtask, process or instruction level. On the hardware side, granularity refers to the number of CPUs -- from two in traditional multiprocessing systems to literally thousands in some systems under development. In general, fine-grained software goes with fine-grained hardware, and vice versa.

- Symmetry vs. Asymmetry -- Multiprocessing systems where the individual processing elements are not identical are asymmetrical. This is normally found with systems that have different processors for computation and I/O. Logical asymmetry refers to systems where the hardware elements are identical (for instance all MC 68000s), but are assigned different tasks.

The Outlook

Multiprocessing systems have been around for many years, but widespread interest outside the halls of academe has only recently emerged. The two main reasons for the recent attention are the usual ones: performance and cost.

Performance in this case is absolute, not just relative, as scientists are convinced that the fundamental laws of physics will make it impossible for uniprocessor systems to achieve the speeds necessary to make certain types of applications feasible. Thus, parallelism is seen as the only option on the horizon offering massive boosts in performance speed.

Moreover, because price/performance tends to be better on small processors than on large ones, multiprocessing should theoretically prove to be more cost-effective than traditional architectures in providing adequate multiuser throughput. Once the technology matures, it should also be more reliable (as fault-tolerant redundancy will be automatically included) and expandable.

Nevertheless, despite everyone's anxiety about money, the new technologies are not simply the progeny of powerful and cheap 32-bit microprocessors. Some of the most interesting and successful multiprocessing vendors (e.g., Tandem, Alliant, Convex, and Scientific Computers) build systems that are not microprocessor-based. Especially within the technical computing community, where maximum performance often becomes the key variable to the near-exclusion of other factors, traditional logic circuitry still packs the desired wallop.

Since multiprocessing and parallel processing systems address both compute-intensive and throughput-intensive applications, they are at least potentially

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INSTALLED PERFORMANCE CAPACITY ON U.S. LARGE- AND MEDIUM-SCALE SYSTEMS, YE1984
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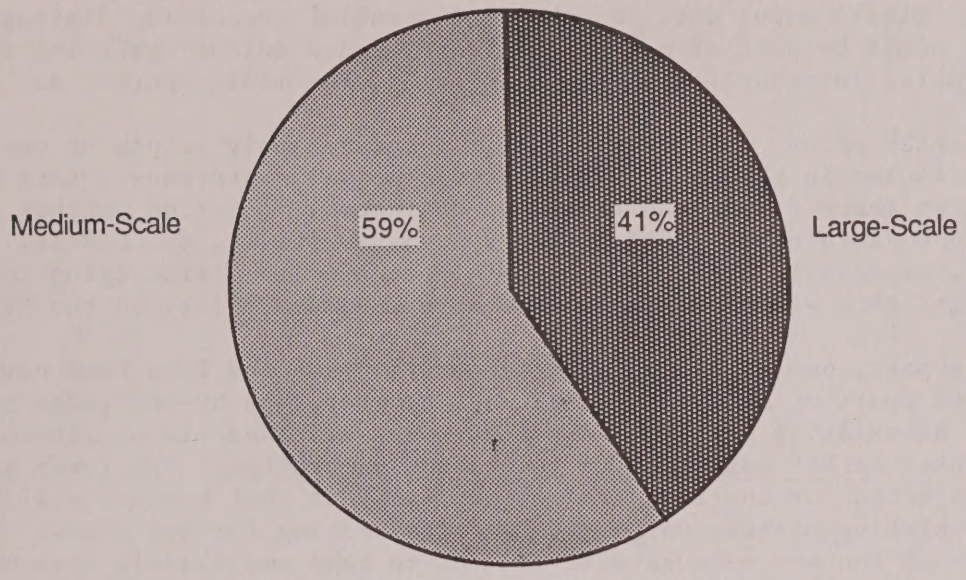

180,000 MIPS (180 BIPS OR GIPS)*

*Information on MIPS is partially vendor-supplied, and partially independently developed. MIPS are used, despite the differences between instructions and other problems, because they have become a handy performance gauge. They are much less relevant below the level of medium-scale systems; if applied to small-scale systems, the new category would offer more MIPS than either large- or medium-scale systems.

applicable to virtually the entire data processing market. Multiprocessing is particularly well suited to transaction processing, software development, and end-user-oriented work typical of most so-called office automation systems. Parallel processing is well-suited to the world of Fortran, or other languages that make extensive use of loops. Because of their wide applicability, the new designs can be viewed as part of the evolution of general purpose computing.

Since the majority of today's systems are primarily concerned with multiuser throughput, the market for multiprocessing systems is substantially larger than that for specialized parallel computing systems. On the other hand, because certain performance levels can only be achieved via parallel systems, these systems can sell themselves in certain environments, while in others cagey marketers can probably convince a number of users that they really need a Maserati to go get milk at the local convenience store.

These potential technological and marketing dividends will cost considerable blood, toil, sweat, and tears (not to mention money). The difficulties in building these new types of systems are essentially three. First, applications must be examined to find those parts of a program that can be performed in parallel. Then hardware and systems software must be created that can deal with the tricky issues of interprocessor communication and synchronization. Finally, and perhaps most importantly, both vendors and users will need a great deal more experience in designing operating system and application software to take advantage of the emerging hardware designs. Thus far, progress on all three fronts has proven elusive, and too often illusive.

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Once these tests have been passed, vendors will then have to find a way to surmount or finesse the compatibility issue. To leverage off installed bases, some startups have chosen to maintain compatibility with dominant operating systems. Others point out, though, that parallel processing startups that go it alone would be part of a long tradition, since unique operating systems accompanied the introduction of new mainframes, the minicomputer, and the PC.

The latter point, while historically accurate, only points up one of the major obstacles in the path of the new technologies startups. Lots of people have gotten there first, and there is considerable question whether users will respond once more as they did to the System 370 family, the PDP-11, or the Apple II, especially when consumers are more concerned with tying together what they've got than with introducing one more incompatibility to the MIS mess.

In the past, new technology helped to stimulate and then feed new markets. The latest spurt of hardware innovation, however, has by-and-large been directed at existing markets and customer bases. There is no alternative, for the computer market map has lost its terrae incognitae. The lower growth rates projected for the industry reflect the fact that vendors will have to exploit existing markets rather than go prospecting for new mines. For example, many of the new vendors will attempt to take small-scale system price/performance and use it to attack the markets for more powerful processors.

Some will certainly succeed, but success will mean less than it used to, both in absolute terms (i.e., money) and in relative terms. Consider that, for all its success, DEC is only 15% of the size of IBM, and that Apple stands in a similar relation to DEC. That so many of the new players are choosing to rely primarily on the OEM channel is indicative of today's market reality. Unlike the early days of the mini and PC markets, niche hunting is implicit in many of today's multiprocessing and parallel processing business plans.

Technical Computing

The most alluring niche is the market where users not only need the performance capabilities of the new technologies, they can even understand what the new vendors are talking about. It is in the technical computing area that startups are getting the most attention and are likely to have the most impact. Historically, the engineering community has been the pioneer homesteader in new computing technologies (minis, array processors, LANs, graphics, etc.) This will also be true for parallel computing, where vendors lure techies with tales of performance improvements of 4-20 times a Vax 780 for certain applications if they take advantage of vector processing capabilities.

There are two ways of assessing the potential of this market. On the positive side, there is a nearly $6 billion U.S. market for technical computing on small-, medium-, and large-scale systems. This market is based largely on Fortran, which apparently has a special affinity to parallel processing.

On the negative side, note that in 1984 the U.S. market for array processing systems is estimated to have been only $180 million, or less than 20% of what IBM raked in on U.S. System/36 shipments alone. Even if this market grows at 20-35% per year, it does not suggest a lot of business for new high-performance computing players. Clearly, significant market expansion will require some sort of breakthrough that will make the use of vector and parallel processing hardware more attractive than it has been in the past.

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CHARACTERISTICS OF REPRESENTATIVE MULTIPROCESSING SYSTEMS
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Characteristics	IBM 3084QX	DEC 8600 Cluster	Stratus S/32	Tandem TXP-II	P-E 3280MPS	Alliant FX/8	Sequent 8000	Flexible Flex/32	Encore Multimax	Arete 1200	Cray XMP	Elxsi 6400	CONVEX C1	BBN Butterfly	Intel IPSC
Operating Environments															
IBM	x														
DEC VMS		x					V								
Unix	V	4.2				4.2		V	4.2	V		V.2	4.2		III+
Other			x	x	x			x	x	x	x			x	
Primary Application Area															
Commercial	x	x	x	x	x		x	x	x	x					
Technical	x	x			x	x	x	x	x	x	x	x	x	x	x
Processor Characteristics															
Parallelizing compiler						x									
Vector hardware						x					x		x		
Parallel vector						x					x	x	x		x
Parallel scalar					x	x	x	x	x	x	x			x	x
Multiprocessing	x	x	x	x	x	x	x	x	x	x	x	x		x	
Coupling															
Loose		x	x	x											
Tight	x				x	x	x	x	x	x	x	x	x	x	x
Memory															
Global	x				x	x	x		x		x	x	x		
Local		x	x	x											x
Both								x		x				x	
Copies of Operating System															
One per processor		x	x					x							
One per system	x			x	x	x	x	x	x	x	x	x	x	x	x
Processor Type															
Microprocessor			68000				NS32032	NS32032	NS32032	68000				68000	80286
Board-Level	TTL	ECL/TTL		TTL	TTL	CMOS					ECL	ECL	CMOS		
Word Size	32	32	32	32	32	32	32	32	32	32	64	64	64	32	16
Processor Interconnection															
Bus		x	x	x	x	x	x	x	x	x	x	x			
No Bus	x												x	x	x
Number of Processors															
Minimum	4	1	2	2	1	1	2	4	2	1	1	1	1		32
Maximum	4	16	16	16	6	8	12	40	20	4	4	10	1	128	128
Performance															
MIPS	29	4.45	.90	4	4-22	4.45-35.6	5-7	4-40	1.5-15	.9-3.2		6-60	60	60	25-100
MFLOPS	N/A	N/A	N/A	N/A	N/A	1.05-8.4	N/A	N/A	N/A	N/A	1400		7	N/A	2-8
Price Range															
Base	6,500,000	500,000	115,000	143,000	250,000	270,000	55,000	150,000	112,000	52,600	5,000,000	369,000	495,000	8,000	150,000
Maximum processors	6,500,000				850,000	665,000	250,000	1,000,000+	340,000	101,000	14,000,000	2,000,000	495,000	1,024,000	520,000

Figures for MIPS and MFLOPS are partially vendor-supplied, and partially independently generated. Recognizing the problems with both terms, EDP/IR offers the data for rough comparisons only.

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Since the design of array processing hardware is not considered to be all that difficult, efforts to increase the appeal of such attributes will be primarily software-based. Software efforts are focused in several major areas:

- Compilers. Efforts simply to recompile existing Fortran programs to take advantage of inherent parallelism have made significant progress. Convex, Alliant, and Amdahl/Fujitsu all claim to be able to run many Fortran programs with little or no recoding required.

- Software bases. In recompiling existing software, Amdahl/Fujitsu and NAS/Hitachi are focusing on IBM; Convex and Alliant are going after DEC; while Scientific Computer Systems is targeting Cray.

- User-programmable systems. Do-it-yourselfers such as Denelcor, Intel, Elxsi, and Bolt Beranek and Newman offer systems where users have to write their own parallel processing programs. IBM offers a similar capability. These systems will appeal to sophisticated users who are capable and desirous of tuning their systems for maximum performance. Intel has initially targeted the university market, while BBN's base is with the government, particularly DOD.

Some vendors are planning to do practically everything with software. Multiflow, a startup founded by veterans of Yale's Bulldog compiler, is touting its Very Long Word Structure machine, which crams a myriad of RISClike instructions in 64-bit-plus words, as equivalent to multi- and parallel processors.

IBM and Multiprocessing

The interest in jiggering IBM software for sleaker scientific processing in turn reflects a gradual evolution in the IBM installed base that Big Blue is belatedly coming to grips with. Company spokesmen have noted that some 15% of the 308X/4300 system workload is for scientific/engineering applications. Given that 370-type machines have never been renowned for their computational capabilities, it is hardly surprising that vendors of plug-compatible systems and array processors have tried to build a business in this area. IDC estimates that the IBM/PCM worldwide technical computing market (for 308X and 4300 systems) is worth nearly $2 billion per year.

In 1984, both Amdahl and National Advanced Systems unveiled vector processing machines that can work with IBM Fortran programs. NAS offers an attached (Hitachi) vector processor that the host mainframe can call into service when necessary, while Amdahl offers (Fujitsu) supercomputers generally benchmarked at speeds similar to those of Cray. The company believes that its ability to run IBM Fortran will allow it to get into markets that Cray can't.

Ever since its ill-fated 360-90 machine, IBM has mostly ignored the market for vector or parallel processing hardware, although it does have a cooperative marketing arrangement with Floating Point Systems. But as it watches the requirements of technical computing swell, as it weighs the size of the business that Cray has built, above all as it anticipates the growing dependence of commercial enterprises on technical-style processing, the giant seems to have decided that high-performance technical computing is now worth pursuing. All that IBM offers now is a Fortran parallelizing prod on its dyadic and quadratic machines, but it will be investigating massive parallelism in tandem with NYU. Meanwhile an array processor could pop up on Sierra some time next year.

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The Digital World

Ever since its inception in 1957, Digital Equipment Corporation has meant technical computing. IDC estimates that approximately 50% of the more than 40,000 VAX systems in use worldwide go into engineering, scientific, manufacturing, and academic environments, for some $1.5 billion per year. Not surprisingly, many of the new kids in the game are after some Digital action.

The kids include most of the highly publicized startups, among them Convex, Alliant, and Sequent. Only Convex and Alliant, however, are emphasizing strict VAX compatibility plus performance levels far above those available on DEC's largest supermini, the 8600. Both vendors have developed highly sophisticated compilers that allow them to recompile existing VAX VMS Fortran programs for their hardware. The compilers automatically locate and then accentuate parallelizable segments of the program. Each likes to think that its own software is more efficient, hence the crescendoing claims and counterclaims.

Technically, the Convex C-1 is not a multiprocessing system, but its integrated vector processing support offers high performance in much the same way as the addition of an array processor would. Early beta site results suggest that the C-1 can indeed deliver dramatic performance improvements.

Of those companies actually demonstrating hardware, it is Alliant Computer Systems that is making the boldest claims. Its FX Series not only has integrated vector processing capabilities, but, according to Alliant, comes with the only compiler that looks for both vector and scalar parallel possibilities. The FX is also a true parallel system that allows the user to start small and grow up to a Herculean 8-CPU system of up to about 8 MFLOPS. If Alliant can really fulfill its promises, it will have a dramatic edge over the VAX 8600.

Nevertheless, as DEC rightly points out, raw price/performance is only one aspect of the user's decision-making process. Peripheral support and capacity, development tools, third-party hardware and software, languages supported, database products, expandability, communications, service, support, and training are all key factors in the user's buying decision. DEC spokesmen from Chairman Olsen on down have consistently maintained that parallel processing is a niche business, maybe 5%-10% of the supermini market they seek to dominate.

Retrospect and Prospects

The startups maintain that parallel and vector processing systems are applicable to a wide variety of applications, including sorting and searching (the heart of many commercial operations). But a mind-numbing amount of software work must be done before the parallel processing niche can commercialize. Vendors must create parallel languages and parallel extensions to existing languages, and more commercial-grade parallel libraries, tools, and methodologies. Moreover, most users are still unaccustomed to thinking in parallel terms.

Fortunately the scientific/engineering market offers few of these impediments, but by itself it won't be able to meet the utopian hopes of those who see parallelism everywhere in our future. EDP/IR hopes that at least some of the new vendors will not end up sounding like the startup that sent IDC a letter advertising itself as "the hungriest computer company around." That may have been because it was paying its employees stock in lieu of cash, and may help explain why its parallel processor looked like a Frigidaire.

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• FCC RINGS SOME OF MA BELL'S CHIMES. AT&T greeted the decision by the FCC allowing the coordination of computer, telecommunications, and long-distance sales with a new federal marketing unit and a trial program for large corporate accounts. Certain restrictions are still in effect, notably on "enhanced services" like packet-switched data communications, and enough paperwork will be required to enable regulators or courts to unscramble the eggs if they later decide to. However, as the logic of the antitrust agreement at last overtakes Computer Inquiry II rules, the decision opens important new options for AT&T.

• IBM RESHAPES MARKETING. PC-centricity and a desire to streamline efforts have led IBM to move all sales, large and small, to geographic divisions.

• APPLE UPGRADES APPLE II AND MAC, BALANCES PUBLIC PROFILES. To revive user and software developer interest in the Apple II line, Apple has announced an 800K 3.5" floppy and a memory expansion board, still (strangely enough) in the development stage. Meanwhile the Macintosh gets a 20MB hard disk, at $1,499 a better buy than General Computer's internal HyperDrive 20 at $2,795, and Switcher, which allows users to work with several programs simultaneously. Interestingly, although the Macintosh announcements were more significant (at least until the memory expansion board actually exists), Apple carefully gave equal play to both sets of news releases. This seems to represent the new all-Sculley team's renewed commitment to the Apple II, a strategy also on view in Apple's TV ads for (an eerie choice) "Death of a Salesman." Until Macintosh office sales finally jell, Apple II will be the company's Classic Pepsi.

• JOBS MOVES FROM PLAYBOY TO NEWSWEEK. Steve Jobs is still at the center of every news story about Apple, even though he is out as chairman and director and is the subject of a lawsuit by the company he helped found. Hiring five key Appleites for his proposed start-up added potential injury to the insult of competing with his first brainchild, particularly when he took the marketing whiz who kept university sales up while so much else at Apple was foundering.

• CONTROL DATA OFFERING ABORTED. CDC has had to cancel the $300 million securities offering it had placed. A loss for 1985 is predicted.

• IBM GENERATES GRAPHICS ON UNIX VIA VISUAL ENGINEERING. A package from Visual Engineering, a leader in Unix graphics software, will offer charts (i.e., data rather than geometric representation) on IBM mainframes running IX/370 (IBM's version of Unix-V) as a guest operating system. Keep an eye on Visual Engineering's other graphics products if, as many expect, the long-anticipated IBM engineering workstation turns out to be Unix-based.

• ROSEN USES PARADOX TO ENTICE LIGHTNING TO STRIKE THRICE. Ansa Software handed over the headlines to the company's venture capital backers to let the public know that Paradox, its AI-flavored relational database management program, has won the interest of Ben Rosen, lead investor in Lotus and Compaq.

• CRAY SUPERCOMPUTER AT MID-LIFE. By adding four new X-MP models with expanded memory and knocking $2 million off the cost of one model (after the 19% price cut, the X-MP/24 goes for a bargain-basement $8.5 million), Cray is offering intriguing testimony to the growing maturity of its market: now a three-year-old supercomputer line can use a mid-life kicker.

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EDP industry report

● THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"The Gray Sheet"

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IDC INTERNATIONAL DATA CORPORATION

MAJOR VENDOR COMMUNICATIONS STRATEGIES: TALKING TIL THEY'RE BIG BLUE INTERFACE

Maybe they should have been meeting in the mirrored halls of Versailles, where so many other treaties have been signed. In Paris on September 10 IBM announced Open Systems Transport and Session Support (OTSS), a product supporting "selected functions" of layers 4 (transport) and 5 (session) of the Open Systems Interconnection (OSI) Basic Reference Model. The first three layers (physical, data link, and network) of the Geneva-based International Standard Organization's proposed communications standard are already supported by IBM.

One-worlders who hope that the ISO-OSI model will become the universal standard for multivendor network design can take comfort from IBM's activity, but not too much. Concerning the remaining two layers (6 is presentation, and 7 application), which are still fragmentary on ISO's part, IBM promises only to "evaluate standards . . . as they are completed," and to develop products in support of them "based upon business considerations." Anyone who doesn't appreciate the immensity of the loophole represented by that last phrase probably also thinks that the veto power in the Security Council is used only for altruistic ends. For the nonce, at least OTSS's access to OSI layer 5 allows IBM users to create their own software to support layers 6 and 7 as they coalesce.

The layers of OSI offer an important metaphor for the gathering campaign to force computers to communicate better with one another. The entire issue, like the OSI, is a multilayered onion that must be peeled back skin-by-skin -- and there will be a lot of tears shed ere the onion is ready for consumption.

Conceptually the most important layers are three-deep, with innumerable layers within each to be uncovered:

- Intravendor. Given the computer world as it has evolved, this means getting incompatible IBM computers to interact.
- Intervendor. This means others interacting one-on-one with IBM.
- Multivendor. The goal is mutual dialogue among everybody.

There has been recent or imminent activity within all three, but there will have to be much more before users can get fully interactive communications.

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IBM's Intravendor Option: Take It or Leave It

The umbrella under which all IBM systems will eventually mingle will be DISOSS, its organizationwide document distribution and library system running under MVS. DISOSS's Document Content Architecture/Document Interchange Architecture (DCA/DIA) already allows editable exchange of documents among S/370s, PCs, S/36s, 8100s, and 5520s. As of January 1, there were some 470 DISOSS licenses in the United States; this number should quintuple by January 1, 1987.

By then, IBM is expected to have nudged additional systems under the DISOSS umbrella (e.g., S/38, Series 1, and PC Network), and to have fetched out of the rain more components of systems still only semi-integrated (PCs, for instance, will be able to access DISOSS library services, not just distribution services). One crucial step will occur, if all stays on schedule, in March 1986, with the availability of DISOSS Version 3.3, which will begin the integration of VM-based PROFS. Final-form document transfer will become possible, although PROFS users still won't be able to edit DISOSS documents. As PROFS is gradually brought under the umbrella, DISOSS should acquire some of its attractive OA features (graphics, contextual document search, etc.).

Current limits to DISOSS's functionality are a drawback, but one that can soon be remedied with some PROFS hormone shots. More problematic is the entire orientation of DISOSS, which like so much else emanating from Armonk is designed to stimulate mainframe sales and system upgrades. DISOSS slurps MIPS like kids drinking Kool-Aid, and often demands an upgrade to MVS/XA.

This means that DISOSS is very much integration from the top down. Complementing this theme is the history of SNA, the network heart directing the circulation of data in DISOSS. Because System Network Architecture was developed to facilitate hierarchical communications between dumb terminals and IBM mainframes, one node on the network (i.e., the mainframe) is dominant and must typically be accessed before any other network applications can begin.

Nevertheless, IBM recognizes that PC-centrality in the workplace requires a radical reorientation of communications strategy. New SNA protocols that support peer-to-peer communications are being introduced, although at a pace so deliberate as to seem desultory. Still, progress is being made in four areas:

- LU 6.2. Logical Units (the ports through which end users gain admittance to SNA communications) used to be hierarchical, but because LU 6.2 was designed to be universal it can support peer-to-peer communications. Already it has been implemented on several systems, including the 5520, Displaywriter, Scanmaster, CICS/VS, S/36, and S/38. But it is not a panacea. Several protocols are involved in LU 6.2, and all may not be available in particular applications. Also, full support will take about another year and a half.

- Advanced Program-to-Program Communications (APPC). Designed for distributed transaction processing on systems with LU 6.2, APPC defines a new Physical Unit, PU 2.1 (PUs control physical resources, notably the data link and path control layers of SNA). PU 2.1 gives some control features to hostless networks so that different application programs can exchange data and recover errors. The S/38 and 5520 currently offer APPC, with the S/36 to follow soon. PU 2.1 is not potent enough, though, to link more than a few processors.

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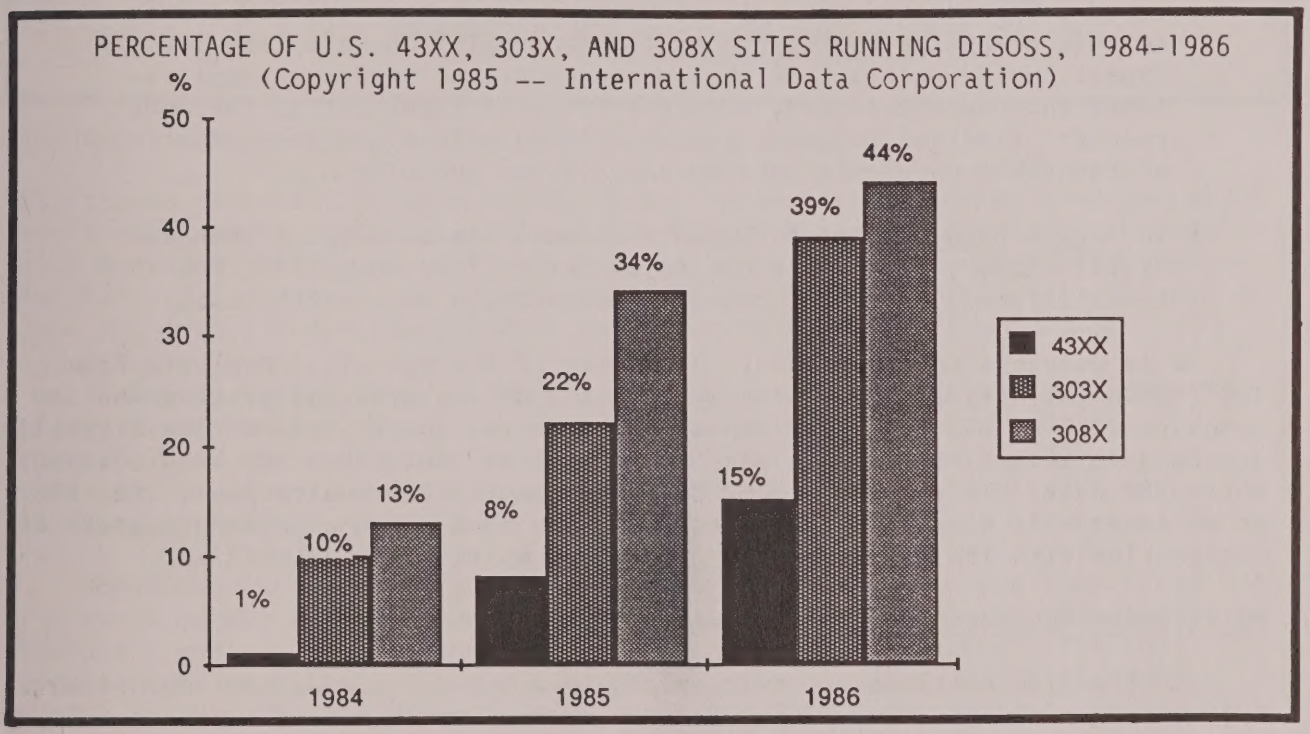
- SNA Distribution Services (SNADS). SNADS, son of DIA Distribution Services, is a network of queues for asynchronous (ergo delayed) data delivery now available on DISOSS, S/36, S/38, 5520, and 8100 DPPX. Since it incorporates LU 6.2, it can support a peer-to-peer network among small-scale systems, but again only a limited number.

- SNA/LEN (Low Entry Networking). Still in the planning stages, SNA/LEN would offer peer-to-peer network protocols through enhanced PU 2.1, transparent network management, and complete connectivity.

IBM's announcement in March of so nebulous a concept as SNA/LEN is the best testimony to date of its awareness of the importance of peer-to-peer communications and of the limitations of its offerings to date. It is an idea whose time has come -- may the reality not trail too far behind.



Other Vendors' Options: Take IBM -- Or Get Left Behind

IBM's competitors face an unenviable task: they are expected by end users to communicate easily with IBM computers, which is something IBM computers themselves are not very good at. But it is a challenge they must meet.

There are two ways to interact with IBM, of varying degrees of efficiency:

- Point-to-point emulation, bringing particular IBM products into a vendor's universe (or vice-versa).

- Network gateways, linking one network with another (i.e., SNA).

Both paths are being actively pursued by anyone desiring to stay in the race.

Recently DEC, Wang, and DG have all been striving to bring one particular IBM product into their systems, the one that's ubiquitous anyhow: the PC.

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- Digital has anointed the PC with VT emulation, and (higher homage still) will offer a software package running DECnet-DOS on the PC or XT starting this month. The PC will become a node on the network and can store virtual files on the MicroVAX II or VAX mini.

- Wang assuages PC users who expect a keyboard to mimic a typewriter's by providing Wang word processing on an IBM PC, whether standalone or linked to VS, locally or remotely.

- Data General matches Wang by marrying the PC and CEOwrite.

The more dramatic announcements, however, have offered gateways opening ever larger segments of two vendors' worlds, one of them Nile blue in hue.

- Digital first offered its SNA/Gateway last year, which uses a dedicated processor and special software on each connected DEC system to toss grappling hooks onto an IBM controller and act like L.U. types, including 6.2. Of the announcements of different applications that have followed, probably the most important is the most recent: External Document Exchange (EDE) allows the communication of revisable documents between VAX systems and DISOSS.

- In August Data General followed suit with its Document Exchange Architecture (DXA), which bit by bit will offer comparable functionality and, like EDE, requires no software on the IBM host.

It is possible to argue about the merits of EDE vs. DXA. Analysts from IDC's SMOS (Strategies for Microcomputers and Office Systems) program who saw a demonstration of EDE came away impressed. Others, though, don't like Digital's approach to gateways, which devours one PDP-11 so that other DEC machines can share IBM data. They might prefer DG's host-to-host communications. But DEC or DG users will simply rejoice that they have been given a growing measure of interaction with IBM without waiting for true multivendor networking.

Multivendor Options: Somewhere Over the Rainbow

An effective multivendor strategy requires network standards. Unfortunately, we've got almost as many standards as vendors, with international committees drafting models (the ISO), major users setting rules (the Navy with DIF, and General Motors with MAP), and major vendors creating de facto standards simply by their presence in the market (IBM's SNA is the crucial instance).

For most non-factory, non-Navy applications, the question will be the extent to which the ISO's OSI and IBM's SNA interpenetrate. It is too early in the development of each to make firm predictions, but there are grounds for moderate optimism. IBM's message from Paris was that it wouldn't sacrifice profits to finish supporting OSI, but that it realized that future profitability might depend on effective links with non-IBM systems, particularly in areas of the world (like Paris) where it is not quite so paramount as in the U.S.

Luckily the ISO listens to IBM (as they say in Geneva, 20,000 IBM hosts can't be wrong), and the two standards are roughly equivalent in organization. Both are layered, with the five layers of SNA more or less like the middle five of ISO (physical control and end user applications remain outside SNA). It won't happen today or tomorrow or the next day, but onions can be peeled.

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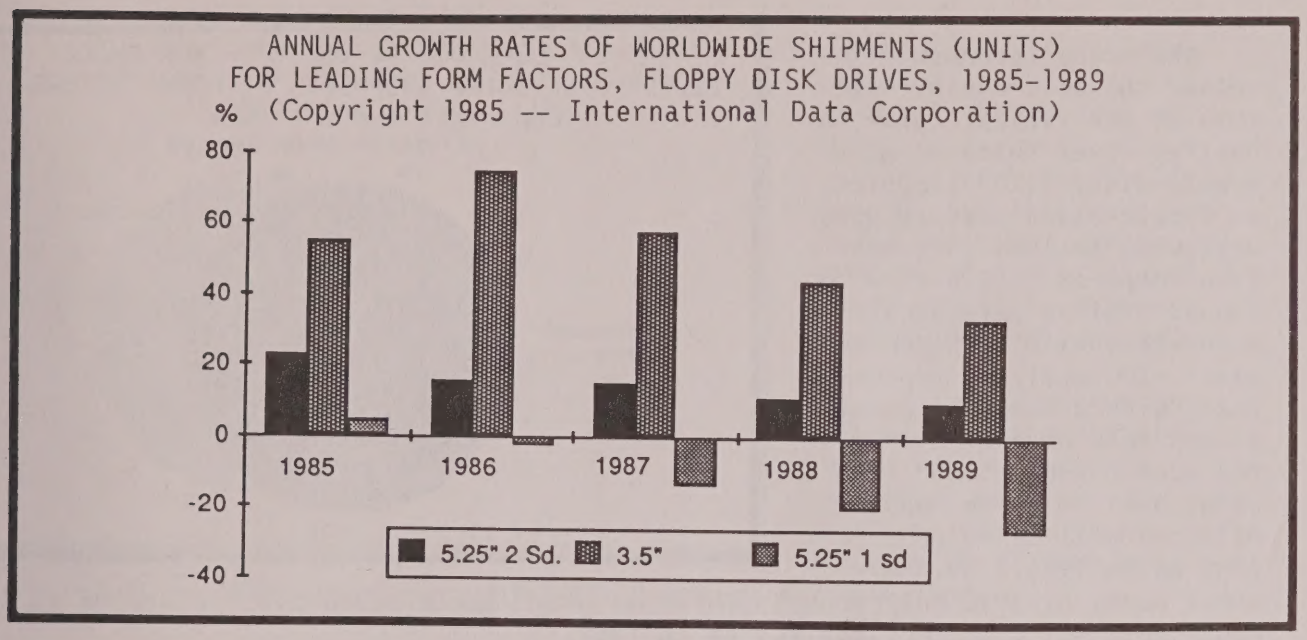

Tandon's Tale: Floppy Flap Follies

Courtrooms have often seen more engrossing and meaningful drama than the stage could ever match. Sometimes, though, the legal dialogue is only an insignificant sideshow, while the real action is going on somewhere else. That has so far been the case with the Great Japanese Floppy Flap (EDP/IR, Vol. 21, No. 3, June 18, 1985), which could now be entering its final judicial phases.

It began last December 6, when Tandon filed a complaint with the International Trade Commission and a suit in federal district court in California charging that three Japanese vendors (Mitsubishi, Teac, and Sony) were violating its double-sided floppy patent. Other Japanese firms were also cited as probable violators, but were not named as defendants at that time.

Sometimes the American judicial system follows not only the elections, but the stock market as well. On May 31 Judge Sidney Harris of the ITC granted a temporary exclusion order against the three Japanese companies. The full commission then met about a month later for a bond review, which required a 60-day cycle. Thus it was not until September 3 that the ITC's decision was finally handed down, a requirement for the charged parties to post bond worth 25% of future imports' value, refundable only if Tandon loses the full trial.

By the time the ITC finished its bond review, though, only Mitsubishi imports were at issue. First Sony settled in early July, then Teac the day after Judge Harris convened proceedings against it and Mitsubishi on August 19. Cutting a deal with Tandon apparently did not come cheap -- lump sums from both (possibly into the millions from Teac), technology transfers (from Sony), and future royalty payments. The two companies, however, had to weigh the impact of bad P.R. on the court cases and U.S. OEM sales. Also, Sony and Teac, not Tandon, would be the real beneficiaries of any slowdown in Mitsubishi sales.

The hearing before Judge Harris on permanent relief ended on August 30. He has another 60 days to announce his decision, which then must be reviewed by the full ITC during another 60-day cycle. The last act curtain of the legal drama, which could include a bar on Mitsubishi double-sided floppies if Tandon wins, should be falling around the end of the year.

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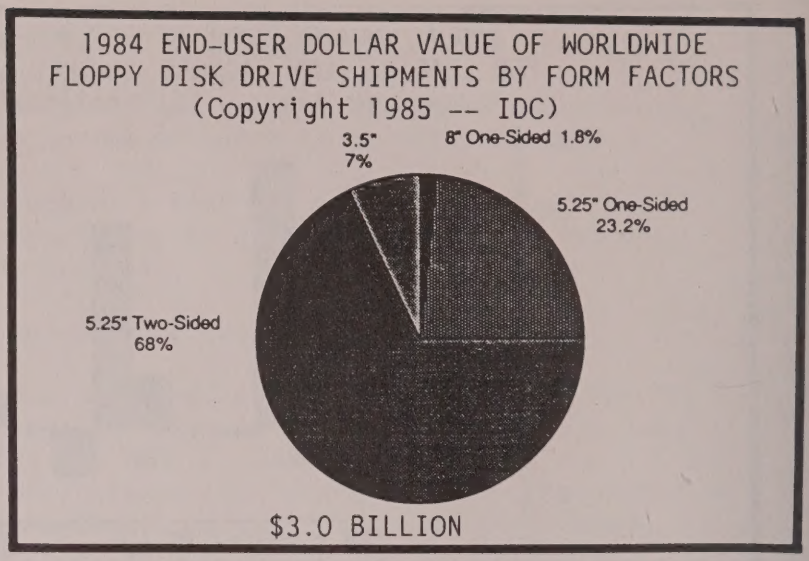

The issue ostensibly involves the most dynamic sectors of the flexible disk industry. Over twice as many double-sided 5.25" floppies as single-sided were shipped worldwide in 1984 (5.7 million compared to 2.6 million). This discrepancy will yawn wider with each coming year. IDC analysts predict that, with a compound annual growth rate of just over 13% for double-sided 5.25" floppies, over twice as many (12 million) will be shipped in 1990 as in 1984. On the other hand, by 1990 only about a third as many single-sided 5.25" floppies will find their way into American PCs as in 1984.

Tandon won a lion's share of the early largesse. IDC analysts estimate that, fed by a contract from IBM for the PC, Tandon's double-sided 5.25" floppy sales exceeded 2 million drives in 1984 and accounted for almost 45% of U.S. shipments. But December's suits revealed Tandon's awareness that an earthquake was already under way that would permanently alter the flexible disk landscape.

As of December 6, Tandon's lawyers counted six American competitors in the areas covered by the suit, including some of the biggest names in the storage industry -- Shugart, CDC, and even IBM itself. Shugart is now dissolved, while CDC and IBM have both exited the field. Nine months later, the lawyers cite Tandon as the sole survivor. ITT-Qume begs to differ, but its half-height double-sided 5.25" floppies are the only available rebuttal evidence.

Nor has Tandon reaped any profits from the loss of domestic competition. In January, IBM canceled its contract with Tandon in favor of lower-cost foreign 5.25" double-sided floppies. Of the eighteen or so international vendors in the field, the overwhelming majority, and the most successful, are Japanese.

Their penetration of the major American PC manufacturers is now so pervasive that it is very questionable whether Tandon could ever again become a major floppy force. During the second quarter of calendar year 1984, Tandon's net income came to $10.4 million; for the same period in 1985, the company posted a $15 million loss. Over the first three quarters of its current fiscal year, which ends this month, Tandon suffered losses totaling $50.2 million.

The gloomy view holds whether or not Tandon wins in court. With an industry giant like Mitsubishi in the dock rather than a smaller company like Teac, 25% bonds will probably be shrugged off with no impact on the volume of imports. A victory by Mitsubishi at the ITC would still leave Tandon the option of continuing the regular court case, but obviously at a severe disadvantage.

If Tandon wins the Mitsubishi suit, the most it can expect is leverage to force the smaller Japanese vendors to buy licenses sooner rather than later. Even if Mitsubishi were banned from the market, it could get back in by settling with Tandon. If it didn't, its future sales would simply be divided

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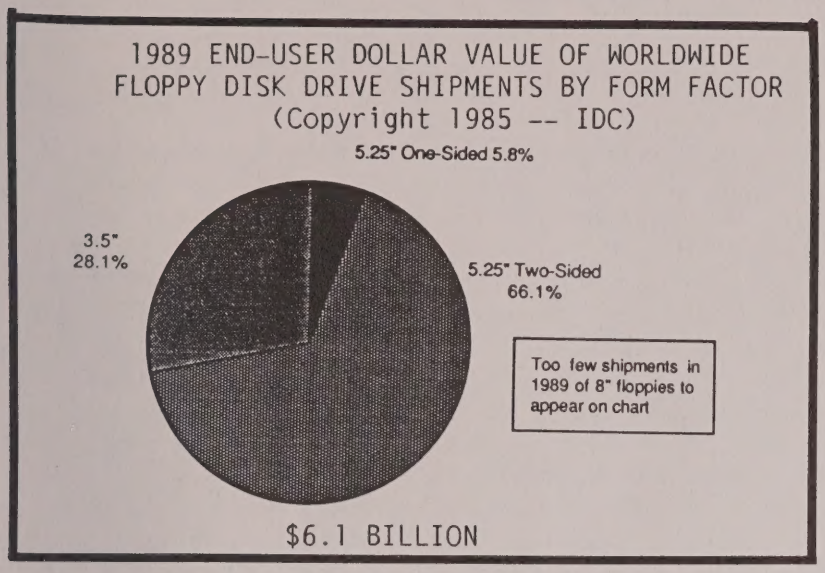

among other foreign manufacturers. The bottom line is this: there does not at this time seem to be any conceivable combination of lump sums or royalty fees that could seriously deflect the present tendency for offshore corporations to dominate double-sided floppy sales.

That is why the court proceedings are essentially a sideshow. Japanese floppy companies have already won the case that matters -- the hearing to win the good opinion of PC manufacturers, including the leading American vendors.

So what is Tandon up to? Probably just a delaying action to allow its troops to regroup. It presumably anticipated that as long as any uncertainty loomed, Japanese companies would market a bit less aggressively and save some sales for Tandon. Moreover, the lump sum payments and even the license fees give Tandon some cash flow at a time when money is in desperately short supply.

But you can bet that the cash will not be invested in future floppy products, or in Tandon's low-end Winchester lines. It is not unlikely that it has been money from Sony and Teac that Tandon has dangled in the bruited talks with Atasi, the bankrupt high-end Winchester manufacturer. Moreover, just as Tandon once moved from heads to the whole disk, it would now like to assemble whole PC systems, using its homegrown disks to cut costs. Already Tandon is responsible for the Tandy 1200, an XT clone. But whether it moves up in storage or over to other OEM relationships with PC vendors, Tandon will not be looking back to floppies for income. The same is also true of its solitary American competitor in 5.25" double-sided floppies. Qume has been digging into the pockets of its corporate sugar daddy ITT so it can shift focus to optical storage.

In certain respects the floppy story is a classic example of overseas manufacturers capitalizing on lower costs to take control of a product moving from cutting-edge to commodity status. Yet the Japanese market position may allow something more: laying claim to the next technology curve before it develops. Tandon's suit was designed to cover all double-sided floppies, not just 5.25" (let alone the dying 8" line), because it wanted to establish squatter's rights on 3.5" disks, which everyone expects to be the next form factor standard.

Despite some gloom-and-doom scenarios, 3.5" floppies will not replace the double-sided 5.25" versions, if only due to the massive installed base of 5.25" software. If 5.25" floppies were not going to enjoy the growth rates projected by IDC, the courtroom struggles today would not be so bitter. But the anticipated 48% annual growth between 1984 and 1990 for 3.5" floppies will make them the most lucrative segment of the market. Their ascent will not really begin, though, until next year, when the PC-2 is widely regarded to appear with a 3.5" option. By then the Japanese, already the only shippers of 3.5" double-sided floppies, should have the market so sewed up that no Americans need apply. Tandon had indefinitely postponed the 3.5" addition planned for this year.

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WORLDWIDE VALUE OF COMPUTER SYSTEM SHIPMENTS BY SIZE CLASS*
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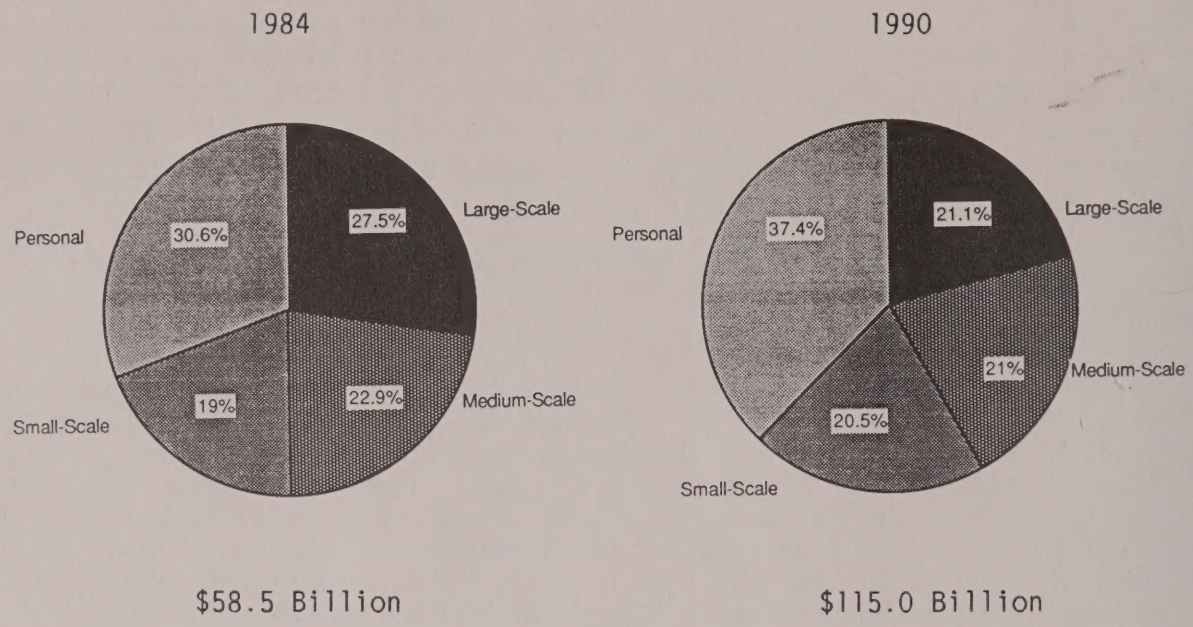

*Large-, Medium-, and Small-Scale shipment values reflect vendor revenue, while PC income is measured by retail value.

The most recent financial news offers little hope for most segments of the industry until the fourth quarter at the earliest, and probably not even then for many players. Except in PCs, there are few niches offering toeholds from which vendors can climb very far in 1985, if only because the industry is sufficiently inbred that bad times in one segment, if they continue long enough, affect virtually all others. All the troubles rebound on semiconductor sales, for example, with TI posting a $3.9 million loss for the most recent quarter.

The best index of the ricochet effect of the computer recession is how the sales slump has finally hit companies that were showing rapid growth during the early months of downtime. Flat sales for the past quarter left Altos with nearly a 40% drop in net income. Tandem showed 27.7% growth through the first two quarters of its FY85 (Oct-Mar), but registered a 1.8% decline for the quarter ending in June. In the storage arena, both Cipher Data and Quantum found new roadblocks impeding the progress they had been showing over the past year.

CORRIGENDA: REVIEW AND FORECAST, PART II

Two typographical errors crept into the red pages in Review and Forecast, Part II (EDP/IR, Vol. 21, No. 5, 6, July 31, pp. 8 and 9):

- In the Medium-Scale Computer Market (p. 8), the $ Million Value Shipped Worldwide for 1984 should be 13,400, not 13,900 as printed.

- In the Small-Scale Computer Market (p. 9), the $ Million Value Shipped in the U.S. in 1987 should be 10,500, not 12,000 as printed.

Please make pen-and-ink corrections in your copy of the issue in question. We apologize for any inconvenience our slips might have caused.

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DOLLAR VALUE OF WORLDWIDE COMPUTER SHIPMENTS, 1980-1990*
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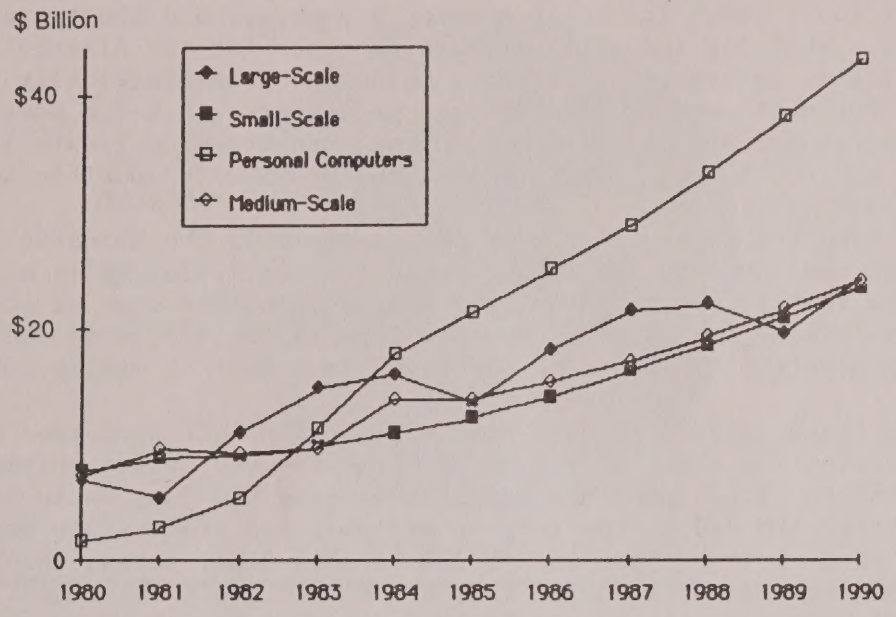

*Personal computer value is based on retail sales, while others' is figured on the basis of vendor revenue.

VENDOR SHARES OF VALUE OF 1984 SHIPMENTS, MULTI-USER SYSTEMS AND PERSONAL COMPUTERS*
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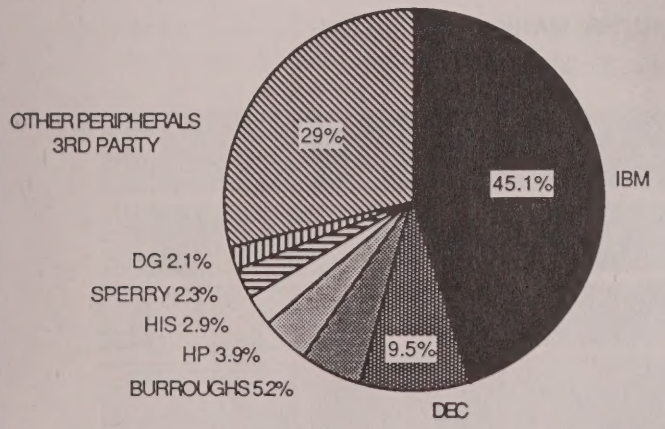
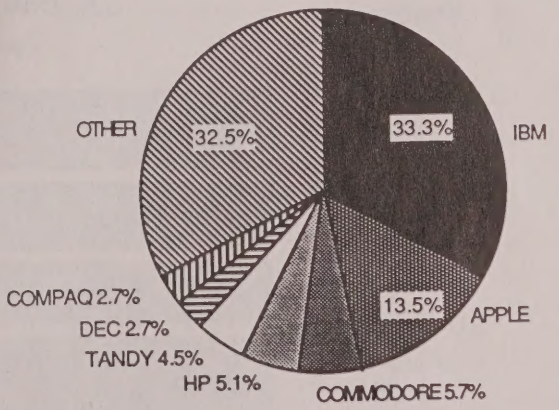
MULTI-USER SYSTEMS



$40.6 Billion

PERSONAL COMPUTERS



$17.9 Billion

*Multi-user shares are based on manufacturer revenue, PC shares on retail value.

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A particularly disquieting note was introduced by Hewlett-Packard in its quarterly report, posting a 12% decline in orders. The domestic drop of 7% was not inauspicious, given its solid quarter a year ago and the travails of its competitors. What led industry watchers to reach for the Alka-Seltzer was its sharp decline in international orders, which has been practically the only positive sign for most vendors for the past half-year. If H-P's news is a harbinger for the future, all bets are off on any industry-wide growth in 1985. All indicators at IDC, however, suggest that the problem is specific to H-P.

In the long run sales will be as strong again in the domestic arena as in the international, but in the long run, as the sage said, we're all dead. The run won't be that long, of course, but long enough that some of the weaker contestants won't make it. Others can look forward to 1990, when the value of computer shipments will be just under five times what it was in 1980.

Leading those others, then as now, will be IBM. It performed admirably in 1984, increasing its share of the value of multi-user system shipments from 53.0% in 1983 to 58.1%. Another way of measuring the jump would be to note how much better IBM did in the large-, medium-, and small-scale segments than the market as a whole -- just shy of 30% for Big Blue, versus 18.4% for all players. Digital is still Number Two, but with a growth rate just under the entire multi-user market's it was lucky to maintain a market share of 7.2%. IBM really does bestride the world of computing like a colossus.

The giant is suffering in 1985 as well, but it has enough market leverage to make up more of its shortfall than most of its competitors. Sierra is shipping now, not November; ditto double-density 3380 disk drives, originally scheduled for October. Even with these canny shell games with delivery dates, IBM this year will fall considerably short of the growth rates recorded since 1981, but it will come out of the downtime with its market domination intact.

MAJOR COMPUTER APPLICATIONS BY SYSTEM CLASSES, 1984
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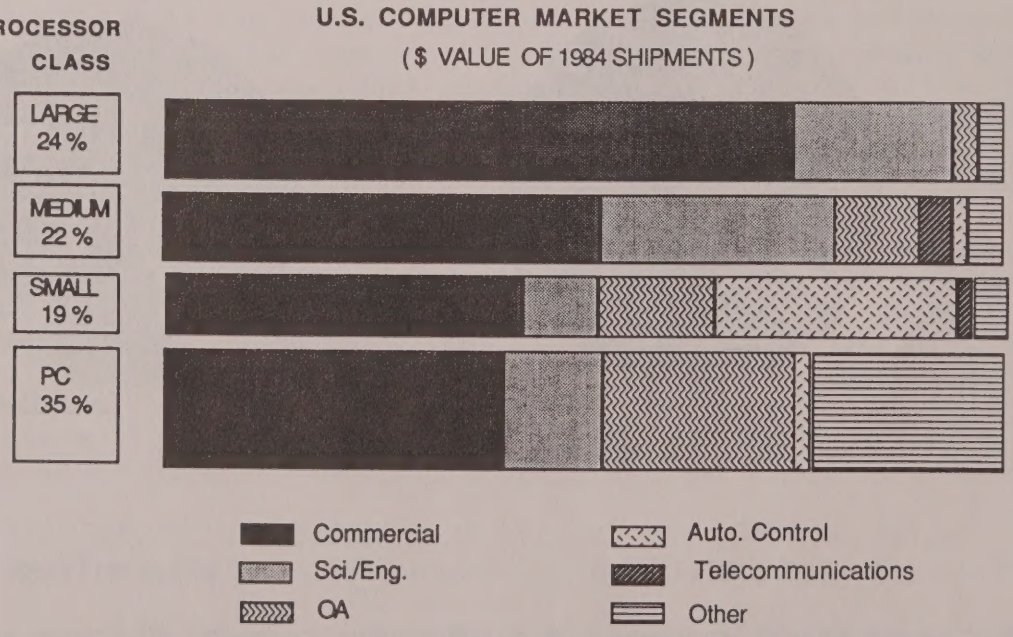

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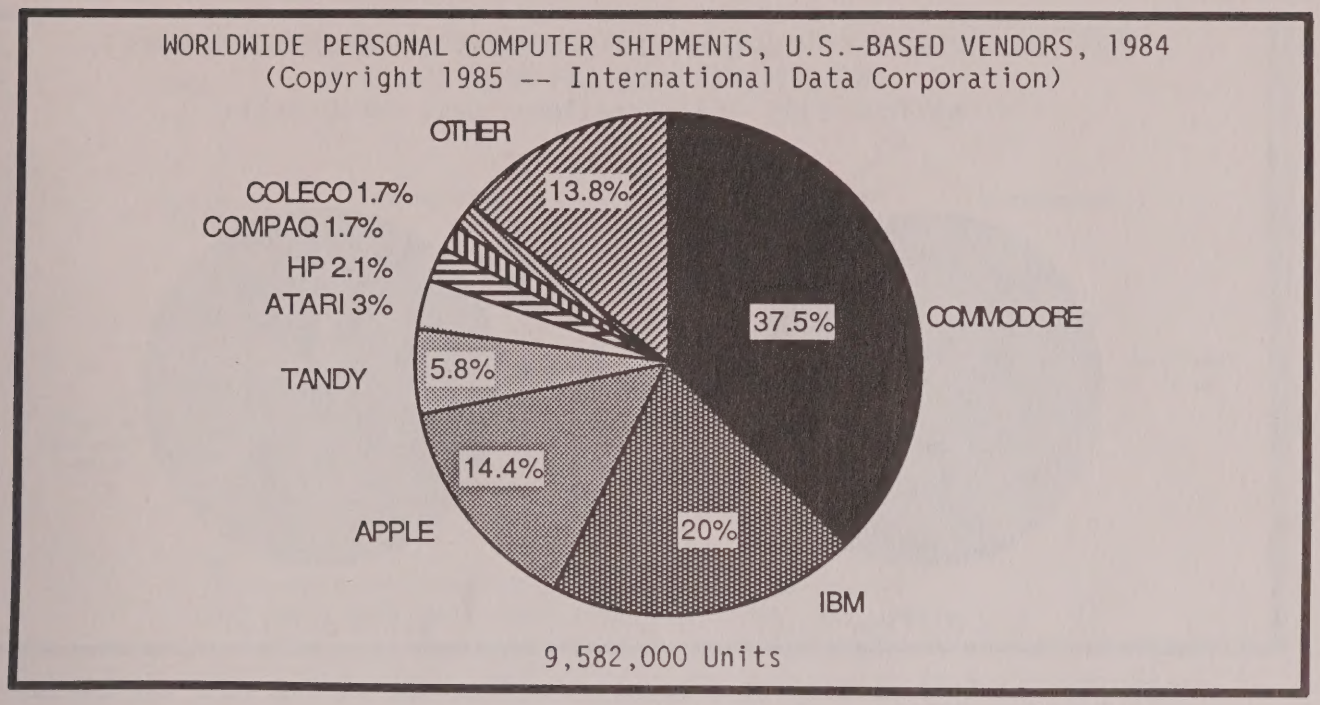

PC-Centricity

Where the computer world of 1990 will look most different from today's view will be in the personal computer segment. From the perspective of new millionaires created, the second half of the 1980s will be less awesome, for the years of preternatural growth in the PC segment have ended. Nevertheless, by 1990 the PC market will have become far-and-away the most lucrative for vendors, and the most critical for them to understand and control:

- Over 9.5 million PCs were shipped in 1984, representing a 33.6% gain over 1983 shipments.
- Worldwide PC shipment retail value in 1984 vaulted a prodigious 58.3% to $17.9 billion.
- With new shipments swelling 42.4% annually through the 1980s, the worldwide PC installed base by 1990 should reach nearly 87 million.
- The five-year compound annual growth rate for PC retail value, 1979-84, was a breathtaking 74.0%; from 1984 through 1989, however, it will be a less awesome but still sturdy 16.3%.
- From their 30.6% share of the total value of computers shipped in 1984 (discounting differences between methods of computing value), PCs will jump to 35.0% of the market in 1985 and not look back.
- By the end of the decade PCs will account for between 37 and 38% of all computer shipment value, while large-, medium-, and small-scale systems will each cluster in the range of 21%.
- The centrality of the PC will be ever more evident in the marketplace, where it will assume duties now done by other segments of the industry (e.g., terminals) and dictate networking strategies.

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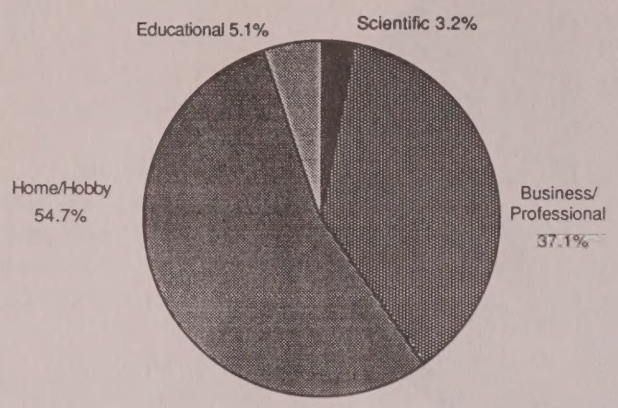
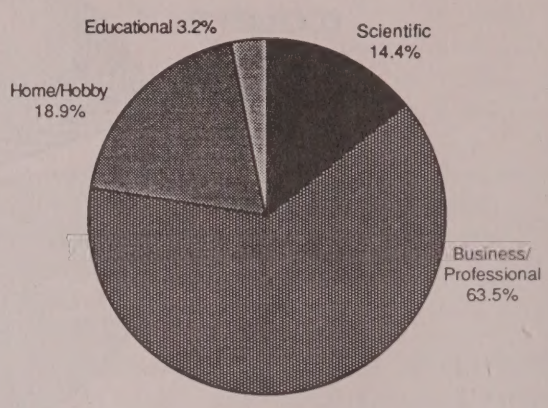
1984 WORLDWIDE PERSONAL COMPUTER SHIPMENTS BY APPLICATION MARKET,
UNITS (Left) & DOLLAR VALUE (Right)
(Copyright 1985 -- International Data Corporation)



9.6 Million Units

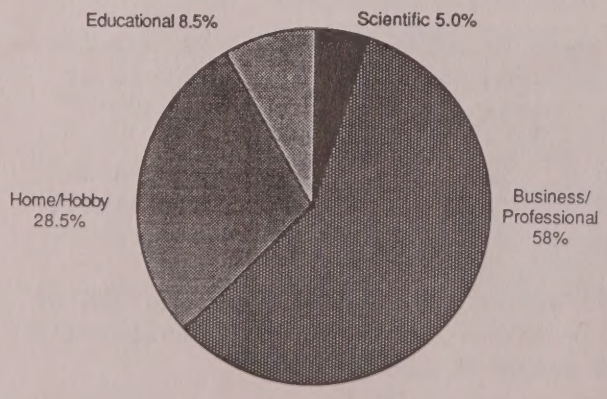


$17.9 Billion

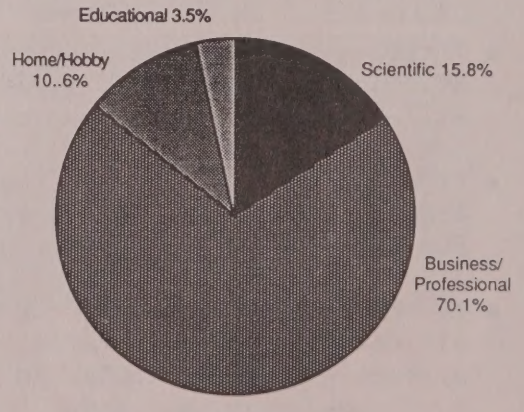
This year marks something of a transition, but not in the same way as in other segments of the industry. Compared to its multi-user brethren, the PC should escape the downturn of 1985 with only minor bruises in shipment value. Growth of just under 20% looks paltry beside the annual doubling of sales that PCs were ringing up on cash registers in the 1981-83 timeframe, let alone the 58.3% growth achieved in 1984. However, it looks celestial beside what the rest of the industry is doing in 1985, and in fact will be a larger growth rate than the PC market will display for any year through the rest of the decade.

What appears (wrongly) to represent a downturn in 1985 is unit shipments of PCs in 1985. Worldwide shipments should be up a mere 3.3% from 1984, while in the United States the number of shipments looks like it will be down 5.0%. However, this seeming inertia in fact represents the shift in PC sales from the volume-oriented home/hobby market to the pricier professional/business sector.

1990 WORLDWIDE PERSONAL COMPUTER SHIPMENTS BY APPLICATION MARKET,
UNITS (Left) & DOLLAR VALUE (Right)
(Copyright 1985 -- International Data Corporation)



16.7 Million Units



$43.0 Billion

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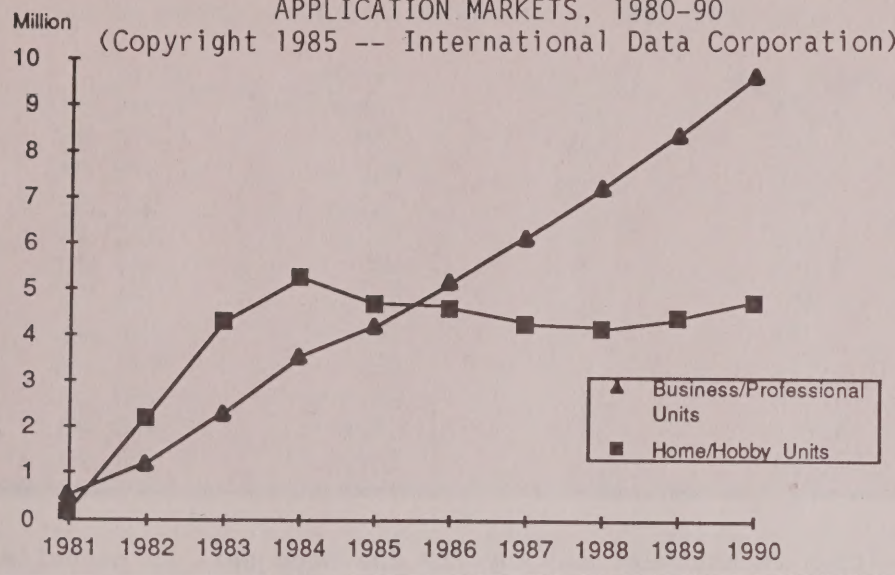
WORLDWIDE PC SHIPMENTS IN HOME/HOBBY VS. BUSINESS/PROFESSIONAL APPLICATION MARKETS, 1980-90
(Copyright 1985 -- International Data Corporation)



And who's to benefit from PC-centricity? There will be many contenders, including not only the leading PC vendors, but also network-oriented players like Ungermann-Bass as well as mini vendors trying to make a virtue out of necessity. Some will get significant shares of the purse, but the inevitable champion will be IBM, which has shaped the PC market as it now exists, and to which all others must adjust their offerings for technology and marketing.

- As the value of its shipments more than doubled (118.5%) over 1983, IBM's market-leading share of PC retail value grew to 33.2% in 1984, up sharply from the 24% share it held the previous year.

- With unit shipments nearly tripling over 1983, IBM leapfrogged over TI and Apple from fourth place to second in PCs shipped in 1984.

- This year IBM will be admiral of both the unit and dollar fleets, as it should tie Commodore in units shipped (2.4 million shipments).

This is not to deny that IBM has had several snafus of late in the PC sector, including the delays in AT shipments and the orphaning of poor wee PCjr. But the demise of PCjr. indicates why Apple and Commodore are struggling so

WORLDWIDE REVENUE, SELECTED PERSONAL COMPUTER PACKAGED SOFTWARE VENDORS, 1984
(Copyright 1985 -- International Data Corporation)

	1984 Revenue ($M)	1983 Revenue ($M)	% Change
Lotus	157	53	196%
Microsoft	115	56	105%
Ashton-Tate	80	40	100%
MicroPro	55	65	-15%
Digital Research	54	45	20%
Multimate	20	10	100%
Peachtree	14	22	-36%
Visicorp	13	50	-74%
BPI	10	7	43%
Software Arts	3	10	-70%

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1984 WORLDWIDE PC SHIPMENTS -- VALUE (Left) & UNITS (Right)
(Copyright 1985 -- International Data Corporation)

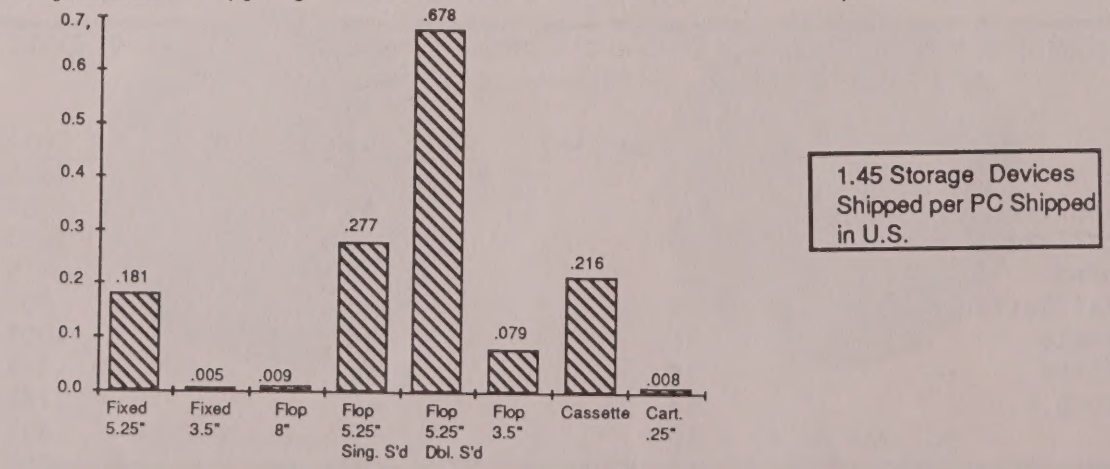
Vendor	Value ($M)	Percent
IBM	5,958	33.3
Apple	2,408	13.5
Commodore	1,014	5.7
HP	912	5.1
Tandy	803	4.5
DEC	490	2.7
Compaq	481	2.7
Wang	337	1.9
Zenith	312	1.7
Convergent	306	1.7
Others	4,872	27.2
Total	17,893	

Vendor	Units	Percent
Commodore	3,589,000	37.5
IBM	1,913,300	20.0
Apple	1,375,100	14.4
Tandy	560,500	5.8
Atari	200,000	2.1
HP	187,550	2.0
Compaq	160,000	1.7
Coleco	160,000	1.7
DEC	122,100	1.3
Kaypro	110,000	1.1
Others	1,204,450	12.6
Total	9,582,000	

hard to reposition themselves, and why IBM has been able to consolidate its hold so firmly on its market share of PC sales: the home/hobby market is sinking fast, and companies (like Apple and Commodore) that have depended on that segment are being forced to retool quickly. The jury is still out on John Sculley's scouring of Apple, except to note that much more needs to be done ere Apple can become a major presence even in the small-to-medium businesses now being targeted. Commodore's new Amiga should appeal to executives who enjoy alternating between rapidly generated spreadsheets (if they can get anyone to write the software) and colorful games of Frogger, but that particular market may not be large enough to sustain them for any length of time.

What appear more imminent threats to IBM come in the business/professional market that it helped define, and come from its own success. The unexpected revelation from Armonk that there will be no PC-II in 1985 should help prevent an erosion in PC sales during this year's Time of Troubles, but it probably also reflects real marketing quandaries on IBM's part. IDC analysts believe that IBM wants to take advantage of the zip of 80286 processors and the lower power consumption and smaller footprint of 3.5" storage, but without undercutting XT/AT sales or undermining the 5.25" installed base. It can't be easy.

RATIOS OF STORAGE DEVICES SHIPPED TO PC'S SHIPPED IN THE U.S., 1984
(Copyright 1985 -- International Data Corporation)



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1984 PC WORLDWIDE INSTALLED BASE -- VALUE (LEFT) & UNITS (Right)
(Copyright 1985 -- International Data Corporation)

Vendor	Value ($B)	%	Vendor	Units	%
IBM	9.1	24	Commodore	7,648,300	34.2
Apple	4.6	12	IBM	2,843,740	12.7
HP	3.0	8	Apple	2,775,100	12.4
Tandy	2.5	6	Tandy	1,560,300	7.0
Commodore	2.3	6	TI	1,365,118	6.1
Zenith	1.1	3	Sinclair	1,200,000	5.4
DEC	1.0	3	Atari	916,000	4.1
Convergent Tech	.7	2	HP	442,300	2.0
TI	.7	2	DEC	241,440	1.1
Compaq	.6	2	Kaypro	230,000	1.0
Other	13.3	34	Other	3,117,702	14.0
Total	38.9		Total	22,340,000	

Meanwhile the clones have landed. Compaq's success must be particularly galling, but what can IBM do? Its best chance to squelch compatible competition would be to shift to a proprietary operating system, but Armonk realizes what that would do to the software installed base, let alone the software vendors who have contributed as much to hardware sales as they have received. Hence IBM has now inked an agreement with Microsoft to cooperate on future projects, notably an improved MS-DOS, but to allow Microsoft to publish the specs.

In short, the PC revolution is far from over. Adding to the sense of flux will be the growing use of PCs in new contexts, even setting aside the multi-user microprocessors that IDC counts as Small-Scale Systems rather than as PCs. For instance, IDC analysts estimate that U.S. PC shipments for 3270 communications, now 19% of the 3270 world, will have assumed 30% of the market by 1990.

Change begets change. With the tide no longer raising all boats, a few software vendors are emerging as big winners, while others are treading water (MicroPro, 1983's revenue leader, slipped to fourth place in 1984) and often seeking partners. With changes in use, power, format, and expectations, the PC storage industry has become especially volatile over the past year. So shall the PC world spin forever down the ringing grooves of change.

RATIOS OF STORAGE DEVICES SHIPPED TO PC'S SHIPPED IN THE U.S., 1990
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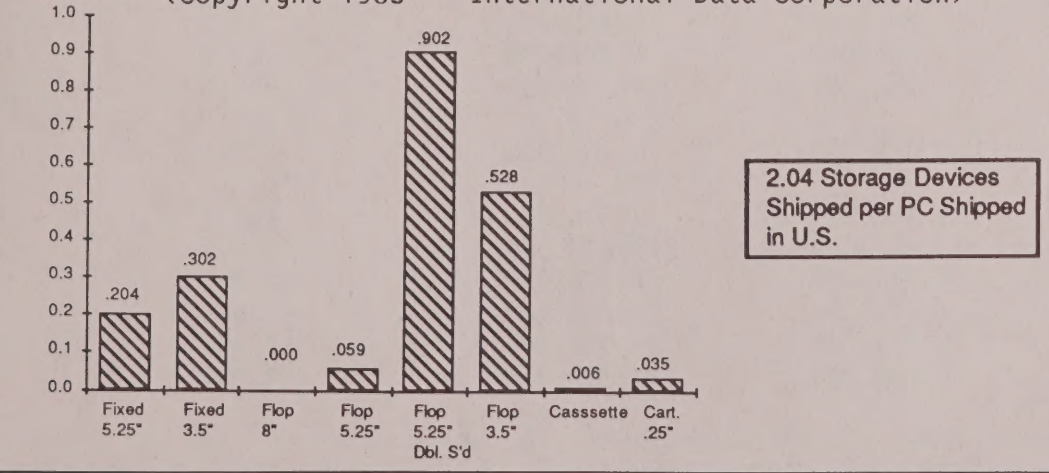

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PERSONAL COMPUTER MARKET -- U.S.-Based Manufacturers[a]
(Copyright 1985 -- International Data Corporation)

	Number of Systems Shipped	Cumulative Number in Use	$ Million Value Shipped	$ Billion Value in Use
		WORLDWIDE		
1980	486,000	1,058,000	1,642	4.7
1981	905,000	1,958,000	2,707	7.4
1982	3,704,000	5,646,000	5,358	12.5
1983	7,173,000	12,794,000	11,304	23.0
1984	9,582,000	22,340,000	17,893	38.9
1985	9,901,000	32,060,000	21,459	58.8
1986	10,977,000	42,747,000	25,096	81.5
1987	11,878,000	54,156,000	28,883	106.8
1988	13,105,000	66,356,000	33,228	137.3
1989	14,759,000	77,338,000	38,081	170.0
1990	16,664,000	86,831,000	43,006	201.7
		UNITED STATES		
1980	379,000	800,000	1,091	3.2
1981	644,000	1,441,000	1,945	5.1
1982	2,813,000	4,244,000	4,180	9.1
1983	5,422,000	9,653,000	8,714	17.3
1984	6,763,000	16,397,000	13,124	28.5
1985	6,419,000	22,684,000	15,422	42.5
1986	7,008,000	29,510,000	17,667	58.0
1987	7,677,000	36,850,000	19,953	74.7
1988	8,488,000	44,694,000	22,625	95.4
1989	9,546,000	51,354,000	25,614	116.8
1990	10,669,000	56,603,000	28,512	136.6
		INTERNATIONAL		
1980	107,000	258,000	551	1.5
1981	261,000	517,000	762	2.3
1982	891,000	1,402,000	1,178	3.4
1983	1,751,000	3,141,000	2,590	5.7
1984	2,819,000	5,943,000	4,769	10.4
1985	3,482,000	9,376,000	6,037	16.3
1986	3,969,000	13,237,000	7,429	23.5
1987	4,201,000	17,306,000	8,930	32.1
1988	4,617,000	21,662,000	10,603	41.9
1989	5,213,000	25,984,000	12,467	53.2
1990	5,995,000	30,228,000	14,494	65.1

[a] International Manufacturers with U.S.-based sales offices are counted in U.S. totals, but not international.

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COMPUTER MARKET SUMMARY -- U.S.-BASED MANUFACTURERS*
(Copyright 1985 -- International Data Corporation)

	Number of Systems Shipped	Cumulative Number in Use	$ Million Value Shipped	$ Billion Value in Use
		WORLDWIDE		
1980	702,280	1,986,670	24,522	134.0
1981	1,138,210	3,082,930	27,267	149.0
1982	3,997,220	7,028,080	34,718	175.0
1983	7,513,760	14,460,550	45,594	208.4
1984	10,008,360	24,350,150	58,483	253.9
1985	10,359,850	34,437,680	61,259	294.3
1986	11,521,780	45,553,910	73,096	345.2
1987	12,518,070	57,446,530	84,183	401.0
1988	13,846,520	70,186,000	93,328	467.1
1989	15,603,520	81,753,000	100,381	540.0
1990	17,612,500	91,885,300	115,006	612.5
		UNITED STATES		
1980	512,020	1,404,580	14,991	75.0
1981	783,790	2,167,390	17,045	86.4
1982	3,001,400	5,131,990	22,200	104.1
1983	5,640,730	10,717,460	29,054	126.2
1984	7,050,350	17,692,170	37,334	156.7
1985	6,723,430	24,226,700	38,822	183.1
1986	7,373,880	31,349,400	46,767	216.2
1987	8,109,290	39,024,100	53,853	251.4
1988	8,992,710	47,240,100	59,125	293.6
1989	10,123,420	54,306,200	62,914	340.2
1990	11,318,300	60,003,700	72,012	385.4
		INTERNATIONAL		
1980	190,260	582,090	9,531	59.0
1981	354,420	915,540	10,222	62.6
1982	995,820	1,896,090	12,518	70.9
1983	1,873,030	3,743,090	16,540	82.2
1984	2,958,010	6,657,980	21,149	97.2
1985	3,636,420	10,210,980	22,437	111.2
1986	4,147,900	14,204,510	26,329	129.0
1987	4,408,780	18,422,430	30,330	149.6
1988	4,853,810	22,945,900	34,203	173.5
1989	5,480,100	27,446,800	37,467	199.8
1990	6,294,200	31,881,600	42,994	227.1

*Dollar values merge PC retail sales with multi-user manufacturer revenue.

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PERSONAL COMPUTER CENSUS
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Top Ten U.S.-Based Manufacturers, by Dollar Value of 1984 Worldwide Shipments, as of January 1, 1985

NAME OF MANUFACTURER	COMPUTER MODEL	IDC SIZE CLASS	AVERAGE PURCHASE PRICE	DATE OF FIRST INSTALLATION	NUMBER INSTALLED IN U.S.	NUMBER INSTALLED OUTSIDE U.S.	CUMULATIVE NUMBER INSTALLED
IBM	3741/3-4	PC	6,500	06/73	1,600	100	1,700
	5100	PC	13,000	11/75	3,000	930	3,930
	5110	PC	17,000	02/78	13,350	2,560	15,910
	5120	PC	15,000	02/80	6,300	1,600	7,900
	5150 (PC)	PC	3,000	10/81	1,645,000	310,000	1,955,000
	9000 Series	PC	10,000	06/82	1,300	0	1,300
	PC 3270	PC	8,500	06/84	39,500	500	40,000
	PC AT 370	PC	5,195	01/85	0	0	0
	PC Jr	PC	1,200	06/84	250,000	0	250,000
	PC-AT	PC	5,795	06/84	22,000	3,000	25,000
	Portable	PC	2,200	06/84	98,000	2,000	100,000
	XT	PC	4,000	05/83	340,000	95,000	435,000
	XT370	PC	8,995	06/84	7,800	200	8,000
				TOTAL	2,427,850	415,890	2,843,740
Apple	Apple II, IIe	PC	1,425	05/77	1,535,000	435,000	1,970,000
	Apple III	PC	3,500	11/80	44,000	16,000	60,000
	Apple IIc	PC	1,195	04/84	300,000	50,000	350,000
	Lisa	PC	10,000	06/83	15,600	4,500	20,100
	Lisa II	PC	4,500	06/84	96,000	4,000	100,000
	Macintosh	PC	2,195	06/84	235,000	40,000	275,000
				TOTAL	2,225,600	549,500	2,775,100
Commodore	128	PC	795	10/83	300	10,000	10,300
	64	PC	250	08/82	2,150,000	1,800,000	3,950,000
	C 128	PC	700	06/85	0	0	0
	C 16	PC	100	06/84	0	50,000	50,000
	Executive 64	PC	1,000	02/83	30,000	30,000	60,000
	PET/CBM	PC	1,000	10/77	225,000	310,000	535,000
	PLUS/4	PC	300	06/84	0	50,000	50,000
	Super Pet	PC	1,995	07/81	54,400	68,600	123,000
	VIC/20	PC	150	06/81	1,390,000	1,300,000	2,690,000
				TOTAL	3,849,700	3,618,600	7,648,300
Hewlett-Packard	110	PC	2,295	06/84	14,500	500	15,000
	120	PC	2,775	12/82	7,210	6,340	13,550
	125	PC	6,200	09/81	12,150	4,000	16,150
	150	PC	3,995	10/83	55,000	55,000	110,000
	220	PC	5,000	04/83	4,700	4,800	9,500
	237,217	PC	6,000	09/84	2,100	900	3,000
	83	PC	2,550	01/81	2,500	2,500	5,000
	85	PC	3,550	03/80	40,600	40,600	81,200
	86	PC	3,700	07/82	17,000	19,500	36,500
	87	PC	4,790	03/82	4,400	4,500	8,900
	9816A/S	PC	5,000	11/82	14,100	18,900	33,000
	9825	PC	10,900	01/76	13,555	22,945	36,500
	9826A/S	PC	11,800	06/81	5,800	8,200	14,000
	9830	PC	16,500	11/72	4,700	4,800	9,500
	9835	PC	13,000	12/78	3,620	4,580	8,200
	9836A/S	PC	14,000	01/81	10,260	12,890	23,150
	9845	PC	28,000	11/77	7,800	11,350	19,150
	Integral PC	PC	4,995	02/85	0	0	0
				TOTAL	219,995	222,305	442,300
Tandy/Radio Shack	TRS 80-100	PC	650	06/83	168,000	27,000	195,000
	TRS-1000,1200	PC	2,050	11/84	2,500	0	2,500
	TRS-80/1	PC	1,000	09/77	247,500	27,300	274,800
	TRS-80/16	PC	9,000	06/82	69,200	7,800	77,000
	TRS-80/2000 Series	PC	2,800	12/83	60,000	5,000	65,000
	TRS-80 Color	PC	399	09/80	445,000	55,000	500,000
	TRS-80/II, IV	PC	1,200	09/81	275,000	55,000	330,000
	TRS-80/III	PC	6,000	07/79	102,000	14,000	116,000
				TOTAL	1,369,200	191,100	1,560,300
Digital Equipment Corp.	Data System 150	PC	15,000	03/79	1,180	900	2,080
	Decmate II	PC	3,790	01/83	48,000	9,000	57,000
	MicroVAX I	PC	17,000	10/83	1,340	860	2,200
	Mini MINC	PC	11,000	10/79	5,850	810	6,660
	Pro 325, 350, 380	PC	4,495	06/82	19,450	6,800	26,250
	Rainbow 100	PC	3,245	06/82	116,550	24,600	141,150
	VAXStation I	PC	21,445	09/84	400	100	500
	VT100 (18X Kit)	PC	5,000	01/82	5,000	600	5,600
				TOTAL	197,770	43,670	241,440
Compaq	Compaq,Compaq Plus, Deskpro	PC	3,000	02/83	210,000	2,000	212,000
Wang	All PC Except Tempest	PC	4,000	01/77	85,000	27,200	112,200
Zenith	Z89,Z90,Z110,Z120, Z150,Z160	PC	5,400	06/82	160,000	40,000	200,000
Convergent Technologies	AWS	PC	6,795	11/81	380	100	480
	AWS Color Turbo	PC	12,990	02/83	1,060	1,240	2,300
	AWS Turbo	PC	6,900	01/82	35,600	6,400	42,000
	IWS	PC	16,000	10/80	9,900	2,100	12,000
	Ngen	PC	2,800	02/83	69,000	13,000	82,000
				TOTAL	115,940	22,840	138,780

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● THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"The Gray Sheet"

D.C.BELLOMY, ASSOC.ED. AUGUST 23, 1985 ● VOL.21, NO.7 P.J.MCGOVERN, PUBLISHER

IDC INTERNATIONAL DATA CORPORATION

VENDORS, USERS SEEK TO MANAGE THE DATABASE MANAGEMENT REVOLUTION

Boston sports fans, desperate on Monday morning, August 19 as their consistently inconstant Red Sox were being swept in two straight series by the Yankees, could turn for answers to the science section of the Boston Globe. There they would have found a story on the Mets' recent success that didn't even mention Dwight Gooden -- it focused on Mets manager Davey Johnson's use of a PC-XT to pick daily lineups based on individual records against the opposing pitcher (the Red Sox, it turns out, only use computers for their scouting reports).

Computer industry cognoscenti, though, might have smiled at the author's belief that comparing statistics is "one of the functions computers have always been best at -- extracting just the facts you need, when you need them, from a sea of irrelevant information." It may well be one of the functions computers are supposed to be good, even best at, but they simply aren't without the proper software. "Abner Doubledata" wouldn't know horsehide about batting averages if Johnson hadn't also invested in a Dbase II database program.

As corporate managers find that they too can't manage without database management, DBMS programs are becoming an essential part of the data processing landscape, at least on the mainframe heights:

- In 1985 DBMS installations at U.S. IBM large-/medium-scale sites should grow about 14% above the 12,000 present as of last December.
- Around 33% of IBM's U.S. large/medium systems currently run at least one DBMS program.
- Almost 90% of all U.S. 3084s are running a DBMS.
- A third of all supermini users rank database management as their most critical product priority, making it the single most sought-after feature (above third-party software, floating point, etc.).
- Even at the low end, IDC estimates that about a quarter of all PCs sold today will acquire DBMS programs in the immediate future.
- Fourth-generation languages, AI, and other innovations promise new gains in database management and new opportunities for vendors.

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Nevertheless, no one seems to feel comfortable with the current situation, neither users who are often unclear about what they need and want, nor vendors who have to translate inchoate desires into ever-more-effective software. Ironically enough, part of the user confusion stems from the very fact that gives many vendors hope: DBMS is one of the few strategic segments of the market that IBM doesn't have locked up, despite heavy commitment to it for decades. In fact, it has been steadily losing ground. In 1984 IBM's DL/1 and IMS software were still the top-ranked DBMS packages, with 36% and 17% respectively of the installed base, but their combined total of 53% is down noticeably from the 65% registered in 1983 (most competitors stayed on an even keel).

Some of this decline can be ascribed to a software version of the Product Cycle Syndrome that has recently been wreaking havoc on 308X sales: just as users have been waiting on Sierra, they have also put their phone calls to IBM about DBMS on hold until they know more about DB2. If anything, the situation is worse with DBMS, since users realize that once they have invested in software applications on a particular DBMS, they have to stick with it and can't migrate as they can on hardware. Moreover, everyone has a general idea what a new generation of mainframes is supposed to do -- pretty much what the last generation did, only faster. In database management, the parameters of what users should expect from change are themselves rapidly changing. People like some security with their revolutions, which has always been IBM's ace-in-the-hole; in the DBMS realm, neither IBM nor anyone else has it to offer.

Potential DB2 users are taking it slow for now. DataBase 2 was announced in 1983, became commercially available late last year, and is finally picking up steam now, though with a minimum of fanfare. DB2 is not yet a contest winner in every aspect; in particular, its data dictionary, inherited from older DBMS products, should be made more active. But some technological Clearasil could cover the few remaining blemishes on DB2's countenance. So why should users balk when DB2 is still the only fully relational package for large-scale systems from a major player, it is probably unexcelled for certain uses, and products garbed in Big Blue vestments tend to sell well anyhow, warts and all?

IBM strategists are pushing DB2, but some tricky marketing is involved: they want to make money by playing off DB2's very real strengths, and they want to make money by taking advantage of the limitations inherent in fully relational database management. There are certain uses for which a sophisticated relational system is unsurpassed, since it allows computer illiterates (e.g., most Americans) to create their own queries with a minimum of training. But there is one big drawback: user friendliness costs a lot of computer time. IBM's own research reportedly indicates that an accelerated IMS system can reach up to 80 transactions per second on a 3081, regular IMS under CICS averages out at 30, and DB2 comes in at 16 -- if at least 13 of them are indexed to facilitate faster searches. If the user knows enough to set the indexes for 80% of the transactions, the question becomes whether a relational DBMS is necessary. In any case, potential customers will have to be concerned about all that production work placed in limbo while DB2 ambles through its database.

The usual answer pushed by IBM is that users should invest in at least two different DBMS packages, a traditional IMS for most transactional applications and a DB2 playing off a carefully delimited database for a restricted number of end users. And maybe while they're at it different mainframes and an enhanced XA operating system as well. Artful blending in fact probably does offer the best solution for users, but it will take careful planning to pull it off.

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PERCENTAGE OF IBM LARGE-/MEDIUM-SCALE SYSTEMS WITH INSTALLED DBMS, YEAREND 1984
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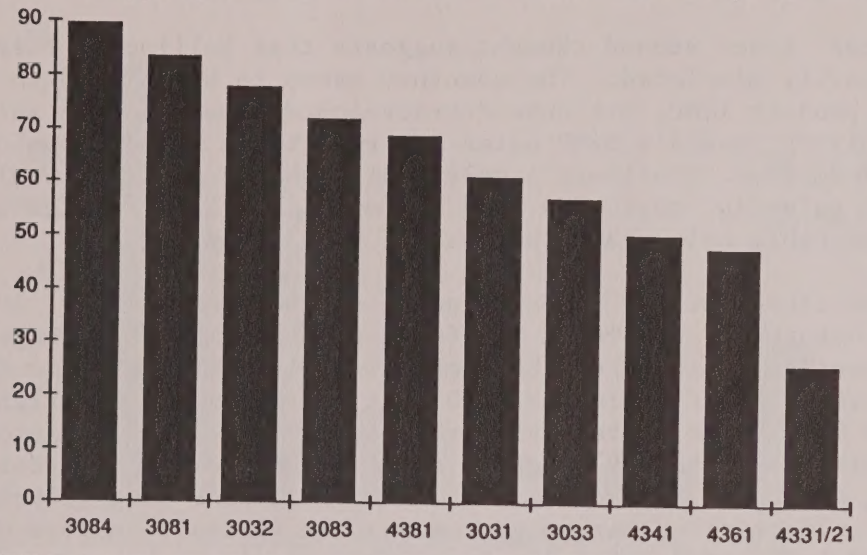

Although there are other fully relational database management systems (e.g., Oracle), the threat to IBM DBMS domination isn't really coming from that direction. Hard on IBM's heels is Cullinet, which in 1984 maintained its IBM market share of around 11% and kept its DBMS installed base in second place. Meanwhile Cullinet is nervously glancing back at other racers, especially ADR.

At Cullinet they will tell you that their IDMS/R is a relational database management system, which in a strict sense it is not, as data are not stored relationally. But IDMS/R can afford to slough off definitional disputes, since if it only offers relational access to data, it offers that access to any data, including data in Cullinet's network IDMS (ADR offers comparable integration). IBM has been criticized by some for the absence of such a bridge, which apparently is currently feasible only with the kinds of trade-offs in IDMS/R.

Whether with IDMS or IDMS/R, Cullinet has successfully persuaded a number of IBM shops that it will be around for a long time and that investment in one of its DBMS systems is strategically sound. IBM's marketing strategy for DB2 could even wind up helping Cullinet, since once a hitherto True Blue user has been persuaded to buy, not one, but two DBMS packages, the customer might be convinced that IBM/Cullinet could be both/and rather than either/or. In any case, as long as its marketing target is the IBM shop, it is essential that Cullinet maintain its reputation for long-range viability.

That was why the company put on a media blitz to place its first down quarter after over seven years of steady growth in the best light. Thinking about those glory days, John J. Cullinane (or Cullinet's PR people speaking in his name) prepared people for the forthcoming bad news by means of a fetching metaphor that turned up in virtually every news story: "Like Joe DiMaggio's hitting streak of 56 games, it had to come to an end sometime. In retrospect, it only illustrates what a remarkable accomplishment it was."

For a while, though, analysts were wondering where Jolting Joe had gone. When the figures came out on August 20, they weren't quite as bad as the early warning signal had indicated, but the 5% growth over 1984 represented a 20%

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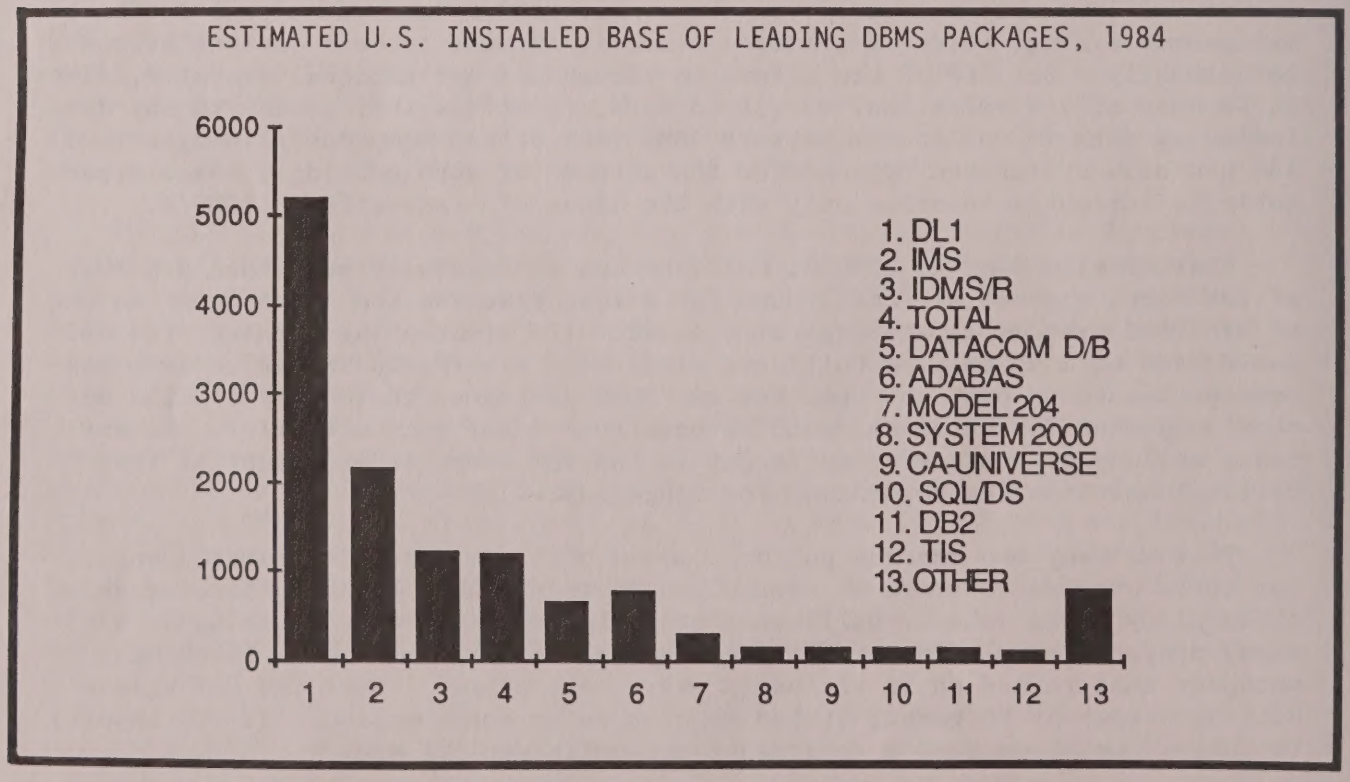
drop from the previous quarter's revenue. Moreover, revenue gains were 23-32% lower than Cullinet had predicted as recently as the end of May. Income before taxes was down almost 24% from the same quarter last year.

Nevertheless, sober second thought suggests that Cullinet's rosy rhetoric was not necessarily misplaced. The downturn seems to be related to problems with just one product line, its outsider-developed manufacturing software. Despite this glitch, overall DBMS sales are reportedly solid (considering the state of the industry). Cullinet's only real problem right now would be psychological, if potential customers read too much into last quarter's results. Joe DiMaggio probably helped hit them out of that slump.

None of the other current players can be counted out, either. Cincom Systems, manufacturer of the TOTAL and (semi-relational) TIS packages, is not yet back in shouting distance of the number two slot it vacated to Cullinet in 1983, but for the first time in the 1980's it was moving in the right direction (up to 9% from 8%). More aggressive marketing is partly responsible for its recovery. Software AG (ADABAS) and ADR (DATACOM/DB) maintained their 1983 gains, staying at around 8% and 4% of the installed base respectively. ADR is adopting such an aggressive marketing stance that it could improve markedly in 1985. CCA (Model 204) and Intel (System 2000) rang in with around 1% each.

It will probably be four or five years before the current DBMS revolution plays itself out, by which time we could very well be undergoing another one as DBMS functions are gradually encoded in the hardware. Moreover, the competition and confusion of DBMS programs with 4GLs and AI will only increase, until the technologies gradually but inevitably converge.



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ESTIMATED U.S. INSTALLED BASE OF LEADING FOURTH-GENERATION LANGUAGES, YEAREND 1984 AND 1985
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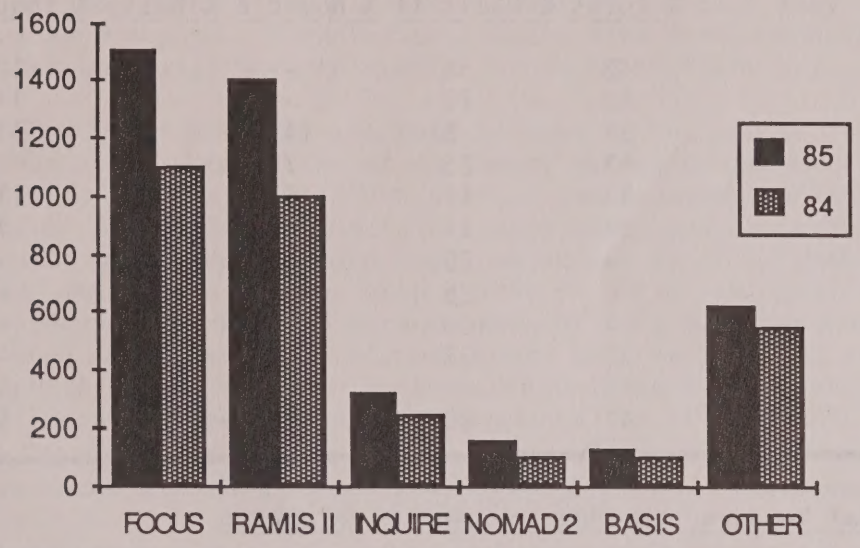

The Fourth Generation Connection

Closely tied to the future of DBMS is the burgeoning world of fourth-generation languages. If anyone doubts that it's burgeoning, it meets EDP/IR's basic burgeoning criterion -- every second product coming down the pike is calling itself one. This puts fourth-generation languages right up there with fault-tolerance and even the all-time champion, artificial intelligence.

Fourth-generation language, technology aside, has become a code name for user-driven, user-friendly communication with computers -- in other words, what the new direction in DBMS is all about. Understandably, then, the most frequently cited 4GLs are those that can query, report, create, and maintain databases without requiring users to bother themselves with information extraneous to the data, like where in the database they might happen to be. Focus, Ramis II, and Nomad 2 are well-known examples of DBMS-oriented 4GLs.

In the critical world of IBM mainframes, Focus is the name to conjure with, even though in 1984 its overall share of the Big Blue market slipped about eight percentage points from the 50% of the installed base held in 1983. Its position on the heights, however, is still unchallenged, since it runs on half of the 3083s installed in the U.S. and almost two-thirds of the 3081s.

Where Focus lost ground in 1984 was among 303X and 43XX users, where the big gainer was Ramis II. In one year Ramis leapt from 7% of the 4341 market to 21%, and from 6% of the 3033 market to 25%. Inquire last year held 9% of the IBM battleground, with strength from 3084s down to 4341s.

Nomad 2, which until recently was available only on a timesharing basis, is a force in the mainframe foothills; because it runs just in the VM/CMS and MVS environments, it has penetrated only into the 3083, 3033, and 4381 markets, where in 1984 it held respectively 11%, 7%, and 6% of the total. With one additional IBM operating system under its belt (DOS/VSE), Basis tied Nomad 2 with 4% of the market. Fully one-fifth of the installed base, however, is now in the "Other" category, an index of the fluidity of the 4GL market.

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DISTRIBUTION OF FOURTH-GENERATION LANGUAGES ON IBM 4300/30XX SYSTEMS, 1984
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System	% Focus	% Ramis II	% Nomad 2	% Basis	% Inquire	% Other
3084	43	38	-	-	12	8
3081	63	17	-	-	11	9
3083	51	5	11	8	11	14
3033	43	25	7	4	7	14
4381	33	17	6	6	11	28
4341	24	21		7	7	41
4361	-	25	-	-	-	75
4331/22	-	25	-	-	-	75
3032	-	100	-	-	-	-
3031	33	33	-	-	-	33
TOTAL:	42	20	4	4	9	20

AI: Commercial Vendors Learning to Speak with a Lisp

A flurry of relevant announcements around the time of a major gathering is to be expected, but the influx of press releases related to the International Joint Conference on Artificial Intelligence held the week of August 19 in Los Angeles might actually mean something: that artificial intelligence is at last preparing to enter commercial data processing in a big way.

Ironically, as innovations in the industry go, artificial intelligence is positively ancient. It has been almost thirty years since it received its name at a scientific conference in 1956; the Lisp programming language, still the de facto standard for AI despite Japan Inc.'s endorsement of Prolog, was created the next year. However, it took over two decades for research to reach critical mass, and then for applications to be developed and geared for the market. This year's Joint Conference is seeing the commercialization of ideas first presented to the Joint Conference in 1977, when Edward Feigenbaum opened the door to current expert systems by emphasizing knowledge representation.

Some of the trailblazing to lead AI across the commercial frontier has been assumed by companies like Symbolics, Inc., now over five years old, and LISP Machines, Inc. Both vendors mix hardware and software AI solutions based on the Lisp machines created at M.I.T. in the 1970's. But taming the business wilderness probably requires homesteading by established vendors, which have begun teaming up with specialized software companies to do just that.

A handful of software companies have acquired a reputation as superb linguists in arcane AI programming languages, or as experts on expert systems. These companies then form a substratum connecting virtually all the recent announcements. Quintus Computer Systems produces Quintus Prolog, which will be marketed by DEC, Apollo, and Xerox; Apollo and Sun will both be Lucid in their choice for Portable Common Lisp; Software Architecture and Engineering is working with CDC and Apollo on versions of its KES tools for expert systems; IntelliCorp's Knowledge Engineering Environment (KEE) is going to TI and HP.

Hardware vendors with an established track record in scientific/engineering computing have become major conduits for the new AI software. DEC, already one

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of the world's largest producers and users of AI, has introduced an AI workstation combining the new Microvax II with VAX Lisp. Announcements by competitors like CDC (expert systems development tools plus Lisp and Prolog for the Cyber 180) reveal a lower level of applicability, but signal that they will be tagging along soon enough. Workstation leaders like Apollo and Sun have seen the future that they will have to work in or watch twilight fall.

Alongside DEC, IBM gives us the best glimpse of the coming commercialization of AI, with its introduction of an Expert System Environment/VM and an IBM interpreter of Prolog. A LISP/VM product has been available to time-sharing users of System/370 computers for some time, and as products the new offerings are no more advanced than those announced by CDC. What matters is that they were introduced by IBM, with a list of potential applications geared to the non-scientific market: insurance underwriting and claim processing, analysis of loan applications and investments, cost estimating, etc. As IBM begins to educate users on how to integrate knowledge bases with databases, it will also be preparing the wedding announcements for AI and DBMS.

PHILIP D. ESTRIDGE, 1938-1985

Revolutionaries are often misfits, in one way or another. Philip "Don" Estridge was a misfit at IBM: an ebullient engineer-entrepreneur in a bastion of smooth marketers. But the powers-that-were in Armonk had the genius to realize that Estridge's drive and initiative could energize a program to bring IBM into the microcomputer age. The result was the PC revolution.

The success of an Independent Business Unit within a corporate behemoth like IBM depends heavily on leadership by the right person, someone willing to take chances with the money of a company that doesn't like taking chances. As soon as he was assigned to lead the Boca Raton, Florida group charged with developing an IBM microcomputer, Estridge began taking chances.

Two of his decisions represented sharp departures from normal corporate policy: opting to shop around for components, and creating an open-architecture box with widely publicized design specifications. The first decision proved instrumental in bringing the PC to market in less than a year after Estridge moved to Florida. The second was even more crucial, for it stimulated the symbiotic relation between the PC and software developers that has pulled the PC onto millions of executives' and professionals' desks.

By the end of 1984 Estridge's group, nominally reintegrated into the corporate structure as the Entry Systems Division, had sold nearly three million units of the PC family of products. By then IBM had gradually come to realize that its future growth would have to be PC-centric. The necessity to integrate future PC development with larger systems, rather than the difficulties of external sourcing for more advanced PC products or the travails of PCjr., seems to have been the key factor behind the decisions earlier this year to move Estridge to a position overseeing IBM worldwide manufacturing and to transfer Entry Systems Division headquarters from Boca Raton to Montvale, N.J.

When Don Estridge and his wife were killed on August 2 in the Delta plane crash, his major contribution to his company and industry was over -- but what a contribution. It was just five years ago that he made his first trip to Boca Raton and began to reshape the relation of computers to American society.

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• IBM THINKING IN PARALLEL WITH NYU. IBM apparently recognizes the growing convergence of commercial processing with innovations once associated most closely with specialized scientific/engineering computation. Its researchers, a lengthy press release of August 20 explained, will develop an experimental parallel processor using an operating system written by a group at NYU's Courant Institute. The Research Parallel Processor Project (RP3) will begin with a 64-processor unit, and then interconnect eight such units for a 512-processor version that should break the 1-BIPS (Billion Instructions Per Second) barrier. Research will focus on how to differentiate between inherently serial and parallelizable problems, and on potential DASD gridlocks. Planned applications include CAD and AI, specifically expert systems and visual perception. The most revealing aspect of the announcement, though, is that it comes now, long before any pay-off; probably a decision was made that users should be told that IBM will not be left at the gate in the parallel processing sweepstakes.

• SPERRY-ENCORE NO MORE. Sperry blamed the divorce on Encore's delay in delivering its much-touted Multimax, while Encore talked vaguely about how the companies "mutually agreed to terminate agreements." It is hard not to suspect intentional foot-dragging on Encore's part, especially after all the attention Multimax got at NCC. As the system neared production, Encore's ambitious leadership team decided that "dependence upon any single channel [is not] prudent or desirable" -- i.e., they want to be an industry giant in their own right, not Sperry's production arm. Sperry meanwhile has seen yet another effort to buy topflight technology for the future come up dry.

• CMI LOSES BIG BLUE LIFELINE. The stiff-upper-lip award for the month goes to Computer Memories CEO Irwin Rubin. After IBM decided to discontinue orders on 5.25" 20MB (PC-AT) disk drives from his company as of January 1, bearing in mind that the deal meant about two-thirds of CMI's income in FY1985 and 81% of revenue for the quarter just ended, Rubin allowed as how losing the contract "will have a negative impact on CMI at least in the short run."

• CONTROL DATA MYSTERIES FROM MINNEAPOLIS-ST. PAUL. Embarrassing news stories about CDC's finances have been appearing with disconcerting regularity. After scrutiny by the SEC, the company has had to adjust its FY1984 earnings down over 80% to $5.1 million and to move its 2Q85 earnings from $23.4 million above-water to a loss of $4.8 million. Then came word that it had to receive waivers from its lenders after falling into technical default. All this while it is trying to get new capital by a $300 million offering in notes and preferred stock. Under the circumstances CDC has been maneuvering to reposition itself. In storage, its move from being a top-to-bottom supplier received new impetus with decisions to drop 5.25" floppies, junk the 3380 factory formed in a joint venture with Memorex, but buy out the latter's share in a thin-film head company. On the mainframe front came CDC's reaffirmation that it would like to sell over half of its ETA Systems subsidiary charged with marketing CDC supercomputers and developing new ones. To CDC's chagrin, potential investors include other computer companies, which could conceivably take control.

• NO WRECK AT DEC. Digital's quarter wasn't bad by current standards (revenue up 12%, earnings down 23%); more importantly, 2,000 MicroVAX II and VAXstation sales since May augur well for the future, as does EDS's tapping Digital to join IBM, HP, and INI in the GMT 400 project.

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REVIEW & FORECAST
Part II

"The Gray Sheet"

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EDP industry report

● THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

D.C.BELLOMY, ASSOC. ED. July 31, 1985 ● VOL.21,No.5,6 P.J.MCGOVERN, PUBLISHER

IDC INTERNATIONAL DATA CORPORATION

ROLLERCOASTER REVENUE CLIMBS AND SLIDES UNSETTLE STOMACHS FOR MEDIUM-, SMALL-SCALE SYSTEM VENDORS

You can't always tell from watching cable television, but most Americans are still Puritans at heart who believe that whatever they suffer now is retribution for having enjoyed themselves too much in the past. No matter what the economists said during the Great Depression, a lot of people were sure they were getting what they deserved for making too much money and drinking too much illegal booze during the Roaring Twenties. These days some medium- and small-scale vendors, especially the former, are feeling that they're getting what they deserve for having had so much fun, and made so much money, in 1984.

- Medium-scale shipments were up 59% in units over 1983, and 40% in dollar value.
- Small-scale shipments gained 22.7% in units, although declining prices kept the growth in dollar value of shipments to 13.3%.
- The installed base of medium-scale systems grew 30%, and of small-scale systems 20%.

But then the drought began. In case anybody hasn't noticed, 1985 looks vastly different from its immediate predecessor:

- The value of medium-scale shipments should climb a paltry 3.7%, while unit shipments will likely be marginally down .3% from 1984.
- Small-scale shipments should climb at a slower 8.7% rate this year, with the dollar value gliding up 10.8%.

IDC anticipates that the worst will be over by the end of the year, but that declining prices will put a cap on how much revenue can be garnered from the two sectors over the next half decade:

- Between 1984 and 1989, medium-scale shipments should grow at an annual rate of 12.9%, with the value of shipments increasing at 10.1%.
- Over the same five years, small-scale shipments should leap forward at 14.9% per annum, with revenue almost keeping pace at 13.7%.

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IBM and DEC continue to dominate the mid-scale market, with DEC winning out on number of systems shipped and IBM cleaning up on revenue earned. Both increased in 1984 at rates faster than the industry average for revenue growth, with IBM more than doubling it (as well as better than doubling its shipment revenues for 1983). Moreover, by increasing the value of its shipments 114.5% compared to DEC's growth of 63.1%, IBM significantly added to its market share. In 1983 Digital registered revenue gains worth 85.8% of what IBM claimed in the medium-scale market, but in 1984 it got only 65.3% of what Big Blue accrued. However, IBM's shipments are always more cyclical than Digital's. DEC has been able to increase the number of 11/750 and up systems it has shipped each year since 1980, with 1984 shipments up a healthy 61.7% over 1983.

New Multi-, Parallel Processing Options

Despite this year's slump, IDC feels that the next half-decade or so should be comparatively healthy for this segment of the market. The question, though, is not so much if, but when alternative approaches to processing data will begin to have an impact on traditional medium-scale sales.

Running a series of boxes in tandem can be cost-efficient and could leach away some supermini revenue. One drawback is that distributed processing is still more an ideal than a reality; one possible compensation is that mainframes could be hurt worse than minis and superminis. At least that's what DEC hopes its VAXCluster solution will lead to.

More serious threats will likely come from multiprocessing and parallel processing, which would distribute the processing among chips rather than different systems. The multiprocessing machines from Encore produced much of what little enthusiasm there was at this year's NCC. From 2 to 20 processors can execute multiple jobs simultaneously. Meanwhile other companies, including Sequent and Alliant, are coming out with systems that they call true parallel processing, which can speed up data manipulation exponentially by running the same program simultaneously on different processor chips.

There are long-term and short-term implications for both, with the long-term more significant. Parallel processing is getting a lot of publicity, so much that there is considerable confusion (some of it intentional) with multiprocessing. All those metaphors about everything in life working in parallel will probably raise capital and stock prices.

However, it appears for now that parallel processing is cost-efficient only in high-end scientific/engineering environments. Over the long run it will probably take over the most computation-intense segments of CAD and CAE from current medium-scale vendors, while at the same time less involved applications will be increasingly handled on PCs.

Nevertheless, scientific/engineering applications in toto account for only 28% of the medium-scale market, compared to 52% commercial. The more ominous development, then, could be multiprocessing, which competes more directly and inexpensively with traditional computers. However, it now seems unlikely that the new competitors could mount an effective campaign for several years yet. Moreover, revenue gains would be limited because they would have to dislodge existing boxes rather than enter virgin territory, the way that minis and PCs did in their glory days. And there's still time for traditional vendors to hop on the bandwagon if they choose.

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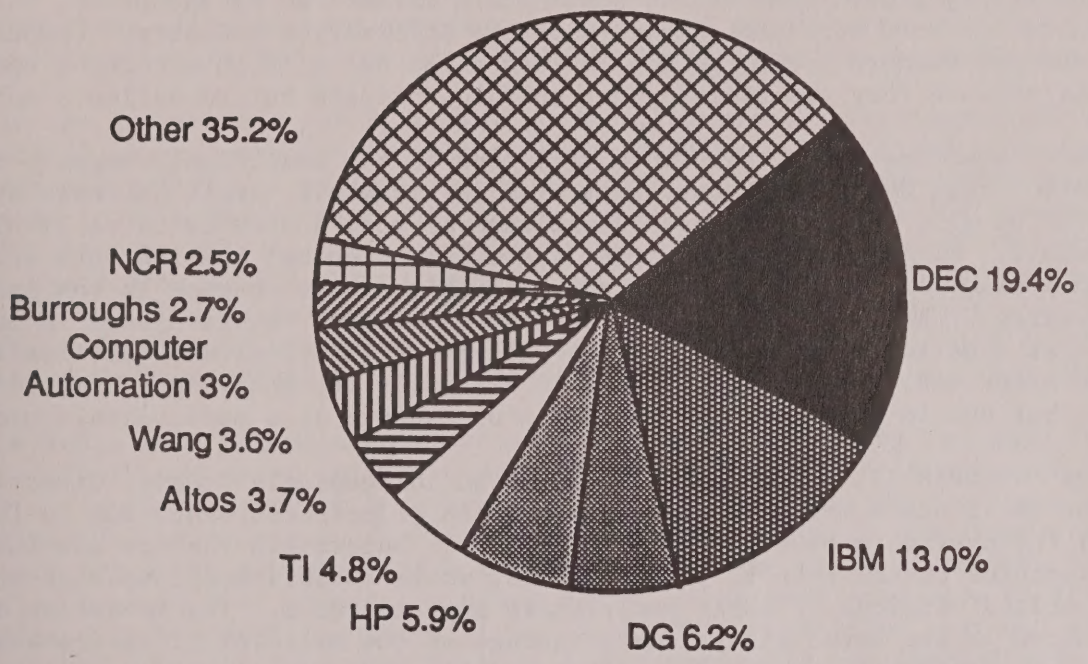

1,861,713 UNITS

1984 MARKET SHARES OF U.S. SMALL-SCALE SHIPMENTS
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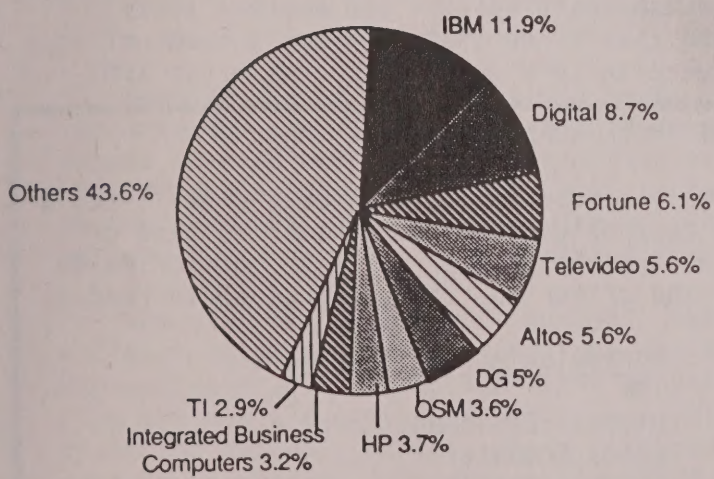
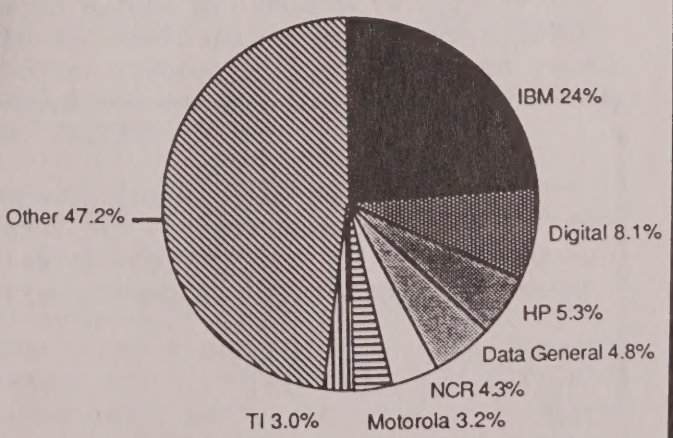


255,540 UNITS



$4.9 BILLION

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1984 MARKET SHARES OF U.S. SMALL-SCALE SHIPMENTS
UNITS (Left); DOLLARS (Right)
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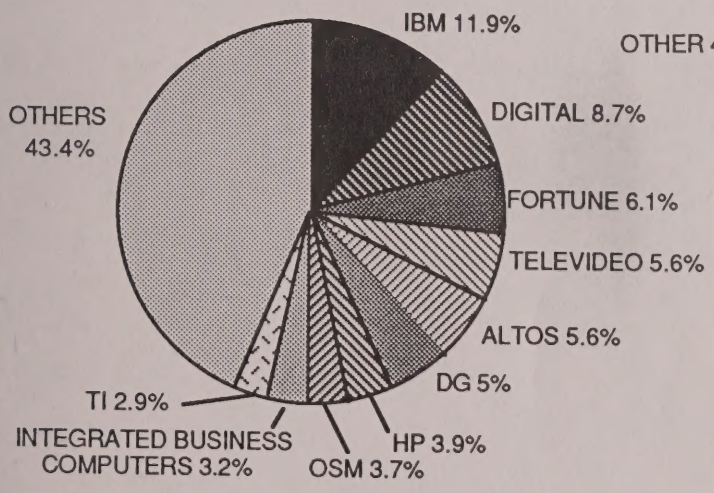
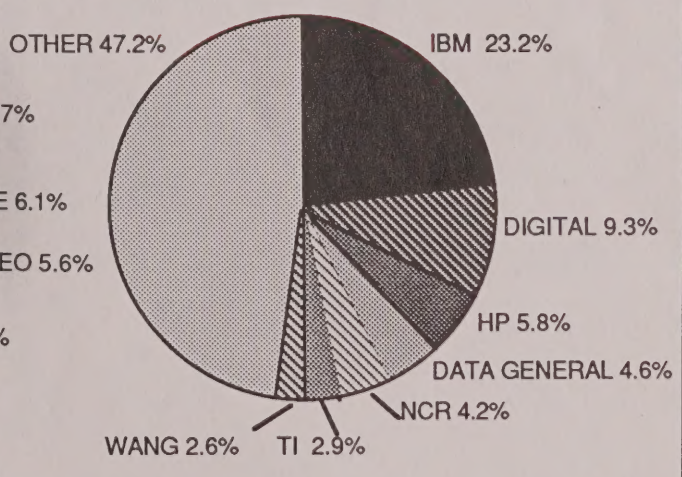
CORRECTION



256,560 UNITS



$6.9 BILLION

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Please turn the page over to find the correct charts. The changes are in the right-hand pies, market shares of dollar value of shipments, medium- and small-scale systems. We suggest that you either staple this sheet in the issue, or paste the correct pies over the originals (the left-hand pies showing unit shipments are there for readers who choose the second alternative).

We sincerely apologize for any inconvenience, and renew our commitment to our readers to exercise the utmost care in each and every issue of the Gray Sheet, with special vigilance in future Review and Forecast numbers.

Bigger Bangs for the Buck in the Small-Scale Market

The steady growth rate of the small-scale market can be deceptive, for there are few more turbulent segments of the information industry. Companies come and go, vendors crack the Top Ten and slide out with gutwrenching speed, if only because they are striving not only to dominate but to define a market.

There sometimes seem to be more varieties to the small-scale segment of the market than Heinz has soups, what with 16-bit minis, small business systems from IBM et al., the new 16- and 32-bit supermicros, and entry-level 32-bit superminis. To add to the confusion, there is conceptual overlap both with the PC and medium-scale markets. Like supermicros that are counted in the small-scale market, the PC-AT can support several terminals, but is listed in IDC's census as a personal computer based on what is still its primary utilization. At the other end, the new MicroVAX II is virtually the equivalent of a 780 in power, but not in functionality, so can't be counted as a medium-scale machine.

The MicroVAX II, though, does point in an increasingly crucial direction for the small-scale market: stunning gains in price/performance due to falling prices for ever more powerful microprocessors. Supermicro vendors aim for open architectures on the latest, sexiest chips, while established companies pack miniaturized versions of their proprietary architectures. The advantage of the supermicro is its versatility; the advantage of the MicroVAX II is its access to the shelfloads of applications developed for medium-scale DEC machines (All-in-1 is now available). Whether new supermicro or established-vendor-on-a-chip, the microprocessor-based small-scale system offers a low cost/high performance combination that is ideally suited to specialized marketing by VARs.

IBM has maintained its position in the small-scale market almost solely on the basis of System/36 sales. In one year S/36 revenue jumped from 15% of the dollar value of IBM's small-scale shipments to over two-thirds. Much of this growth has been siphoned from lower-end S/38 sales, but IBM need not weep: in two years S/36 raked in more money than small-scale S/38 models brought in five (of course, S/38 products ranked as medium-scale systems are another story). Revenue from Series 1 machines has been flat since 1982, but for income not to have been falling on a product introduced in 1976 represents a gain for IBM.

TOP-TENNING THE SMALL-SCALE MARKET

Since last year EDP/IR has given only a Top Ten listing for the small-scale and PC markets, but rankings can vary depending on whether installed base or annual shipments, units or dollar value are chosen. If units in the worldwide installed base or 1984 shipments were the criterion, the rankings would read:

Worldwide Installed Base	Worldwide Annual Shipments
Digital Equipment Corp.	IBM
IBM	Digital Equipment Corp.
Data General	Altos Computer
Hewlett-Packard	Fortune Systems
Texas Instruments	Televideo
Altos Computer	Data General
Wang	Hewlett-Packard
Computer Automation Inc.	OSM Computer
Burroughs	Texas Instruments
NCR	NCR

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Unix Percolates Through the Mid-Markets

Burroughs and Sperry may not have been able to agree on merger terms, but they do think alike on some questions. They came up with very similar strategies at this year's NCC in Chicago, notably their decisions to emphasize Unix.

In the large-scale and PC market sectors, where software compatibility is a critical issue, vendors brag about their technical ties to IBM products. In the two mid-markets of medium- and small-scale systems, on the other hand, the trend is to talk about Unix. The comparative dearth of commercial programs written for the Unix operating system is not as detrimental in mid-market sectors, where programmers abound who find Unix relatively easy to write for. Also, since computer professionals tend to run small- and medium-scale systems, what many feel to be Unix's user unfriendliness need not be a major drawback. Meanwhile Unix's portability can be incorporated in users' networking plans.

Deciding to accentuate Unix, though, need not mean taking the same approach to it. There are essentially two attitudes towards Unix on the part of major vendors: support, more or less grudging, and endorsement, more or less enthusiastic. The chief reason for vendors' diffidence is their commitment to proprietary operating systems, which they often feel are superior to Unix in the markets in which they compete. In any event, sales have been made on the basis of alleged superiority to others' (typically IBM's) operating systems, and the established customer base must be supported technically and psychologically.

For all of the references to Unix in Burroughs' NCC booth, it still seems to fall into the more-or-less-grudging-support category, especially if one starts to talk with the company's marketing personnel. Wang now has IN/ix, billed as the first in a series of Unix offerings bridging its PC and VS lines, but you would hardly know it from reading the company's press releases. The most reluctant support for Unix probably comes from IBM, which is loath to add asteriks to its announcements noting that Unix is a trademark of AT&T. Nevertheless, Big Blue's new IX/370 offers Unix as a guest system for Unix users who want to use a System/370 machine, including any in the 43XX medium-scale line, and don't mind not being able to exchange files with regular IBM systems.

Despite the importance of its large customer base, Sperry is gambling on the more-or-less-enthusiastic-endorsement approach to win new sales. The single message that Sperry wanted visitors to NCC to take away was the company's "Focus on Unix." Data General is touting its two Unix operating systems as the strongest Unix offering around. About 20% of VAX machines currently run on Unix, with some at DEC estimating that the MicroVAX could be 40-50% Unix.

Why all this motion and emotion? What is generating fervor from some, and at least reluctant recognition from the rest? One factor is the possiblity, however remote, of using IBM's own proprietary operating systems to rope it off from the new industry standard. In a related development, American vendors are eying the European market, where in February the seven leading indigenous minicomputer companies joined to standardize their software on Unix.

A second factor of even more immediate consequence is the federal government's interest in sponsoring, and maybe imposing, an industry standard. Although different agencies and projects still vary on whether they want mere Unix support or full endorsement, the trend is clear: Unix is now a standard RFP (Request for Proposal) requirement for government contracts.

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MEDIUM-SCALE COMPUTER MARKET -- U.S.-BASED MANUFACTURERS
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	Number of Systems Shipped	Cumulative Number in Use	$ Million Value Shipped	$ Billion Value in Use
		WORLDWIDE		
1980	16,100	55,700	7,300	34.9
1981	19,200	68,000	9,600	39.0
1982	24,100	86,900	9,200	45.0
1983	23,800	106,300	9,600	49.7
1984	37,900	138,300	~~13,900~~ SEE VOL 10 #8 P.2 13,400	58.0
1985	37,800	168,200	13,900	65.1
1986	44,800	203,600	15,500	75.4
1987	52,800	242,900	17,300	86.9
1988	61,400	288,200	19,400	100.0
1989	69,600	337,600	21,700	114.4
1990	77,900	390,200	24,100	129.3
		UNITED STATES		
1980	9,300	30,200	4,500	17.2
1981	11,100	39,000	5,800	21.1
1982	14,100	50,500	5,600	24.5
1983	14,700	62,900	5,900	28.2
1984	23,100	82,800	8,300	33.3
1985	21,500	100,500	8,400	37.0
1986	25,900	122,400	9,200	43.5
1987	30,900	146,700	10,300	50.7
1988	36,300	175,100	11,500	58.9
1989	41,400	206,000	12,800	67.8
1990	46,300	239,000	14,200	77.1
		INTERNATIONAL		
1980	6,800	25,500	2,800	17.7
1981	8,100	29,000	3,800	17.9
1982	10,000	36,400	3,600	20.5
1983	9,100	43,400	3,700	21.5
1984	14,800	55,500	5,100	24.7
1985	16,300	67,700	5,500	28.1
1986	18,900	81,200	6,300	31.9
1987	21,900	96,200	7,000	36.2
1988	25,100	113,100	7,900	41.1
1989	28,200	131,600	8,900	46.6
1990	31,600	151,200	9,900	52.2

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SMALL-SCALE COMPUTER MARKET -- U.S.-BASED MANUFACTURERS
(Copyright 1985 -- International Data Corporation)

	Number of Systems Shipped	Cumulative Number in Use	$ Million Value Shipped	$ Billion Value in Use
		WORLDWIDE		
1980	197,800	858,800	7,700	34.1
1981	212,500	1,042,500	8,800	40.8
1982	266,800	1,280,000	9,100	49.2
1983	313,600	1,543,700	9,800	56.9
1984	384,700	1,853,700	11,100	65.9
1985	418,200	2,190,300	12,300	74.8
1986	496,400	2,582,700	14,200	84.2
1987	582,700	3,025,300	16,400	96.1
1988	675,400	3,517,600	18,600	109.8
1989	770,700	4,051,600	21,000	125.0
1990	865,600	4,636,400	23,600	140.8
		UNITED STATES		
1980	122,400	566,500	4,600	20.4
1981	127,800	679,100	5,400	23.9
1982	172,800	828,700	5,700	29.4
1983	202,200	992,100	6,100	34.4
1984	262,000	1,201,800	6,900	40.6
1985	281,400	1,431,100	7,700	46.5
1986	337,800	1,705,200	9,000	53.1
1987	398,600	2,014,600	~~12,000~~ 10,500	60.7
1988	465,600	2,357,100	12,000 see vol 20	69.4
1989	533,600	2,731,400	13,600	79.4
1990	600,100	3,145,800	15,400 #8 p.2	89.6
		INTERNATIONAL		
1980	75,400	292,300	3,100	13.7
1981	84,700	363,400	3,400	16.9
1982	94,000	451,300	3,400	19.8
1983	111,400	551,600	3,700	22.5
1984	122,700	651,900	4,200	25.3
1985	136,800	759,200	4,600	28.3
1986	158,600	877,500	5,200	31.1
1987	184,100	1,010,700	5,900	35.4
1988	209,800	1,160,500	6,600	40.4
1989	237,100	1,320,200	7,400	45.6
1990	265,500	1,490,600	8,200	51.2

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A gradual transformation of at least segments of the medium-scale market is therefore underway. IDC surveys indicate that the 10% of supermini sites currently running Unix on at least one of their machines should rise to almost a quarter of medium-scale sites by the end of 1986. To meet this rising demand, about half of all packaged software vendors plan to be offering Unix programs by the end of this year, about double the percentage at yearend 1984.

The changes may also lead to a rearrangement of the medium-scale hierarchy, although the jury is still out on the question. Speculation centers on AT&T, which has hitched its wagon to the Unix star far more singlemindedly than even Sperry. The communications giant garnered much publicity at the end of June when the National Security Agency chose its 3B systems as the centerpiece of a contract that should net AT&T almost $1 billion for sales and services. Certainly the deal lends credibility to AT&T, which with one stroke of the pen will increase its January 1, 1985 installed base by about 22%, and to Unix, which has garnered its gaudiest government seal of approval to date.

On the other hand, the increase to AT&T's installed base just by adding up to 250 3B systems also emphasizes its failure so far to penetrate non-BOC commercial markets. The government's interest in Unix may represent AT&T's best hope to establish itself as a major player in the computer industry. Even its NSA success, however, may not translate easily into other government contracts, since the secretive intelligence agency has unique priorities.

For the immediate future, last year's "Review and Forecast" assessment (EDP/IR, Vol. 20, No. 15, 16, December 12, 1984) remains valid: not medium-scale but "small-scale systems are likely to be the first major Unix success story." Vendors in this segment of the market tend to be smaller and younger, which means that they typically lack long-standing customer bases wedded to proprietary chips and/or operating systems.

As a full-fledged member of the Bunch, NCR looked for a time to be an exception. Besides its successful Tower line of Unix supermicros, which in an OEMed transfiguration serves as a linchpin of the Sperry Unix group, NCR was working on a Unix-based 32-bit proprietary processor that could have extended the lifespan of its 9300 line. It has now given up the endeavor as too costly, however, and seems by default to have anointed the open-architecture Tower system, based on commercially available Motorola chips, as its royal family.

NCR's failure to develop a proprietary chip may be a blessing in disguise. The Unix small-scale success story is based in large part on cost/performance advantages, which in turn depend on the wide availability of Unix microprocessors. The Tower team knew what it was doing when it tapped Motorola.

In the meantime, small-scale Unix vendors are competing vigorously, with enough of them winning sales to raise the hopes and stoke the efforts of all the others. Last year's sweepstakes winner for start-ups in this sector was Altos, which ascended to the top-ten list of small-scale vendors based on the value of 1984 shipments, while Tower sales were a major contributor to NCR's rise from sixth place to fourth place.

This year there is no end to would-be successors to the crown. At NCC a giant inflated frog beside the Charles River Data Systems booth represented virtually the only aggressive marketing at a staid convention and punctuated its promise to become "the largest shipper of 68020-based systems in 1985."

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MEDIUM-SCALE COMPUTER CENSUS
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Medium-Scale computer systems generally support 17 to 128 users in a normal commerical environment. Included are the IBM 4300 line, the mid-range systems from the Bunch, and the high end of lines from companies such as DEC, DG and Prime. System prices tend to fall in the $100,000 to $1 million range.

NAME OF MANUFACTURER	COMPUTER MODEL	SIZE CLASS	PURCHASE PRICE IN DOLLARS (000) BASIC AVERAGE	DATE OF FIRST INSTALLATION	NUMBER INSTALLED IN U.S.	NUMBER INSTALLED OUTSIDE U.S.	TOTAL NUMBER INSTALLED
AT&T	3B20	M	330	4Q/83	200	20	220
	3B20 Duplex	M	600	4Q/83	670	20	690
	3B5/100,/200,/300	M	125	03/84	150	90	240
				TOTAL	1,020	130	1,150
Auragen Systems Corp.	4000	M	135	01/83	10	15	25
Basic Four Corporation	700	M	130	08/77	100	95	195
	730	M	124	06/78	525	590	1,115
	MAI 8000 Series (810)	M	150	04/82	1,103	1,214	2,317
				TOTAL	1,728	1,899	3,627
BTI	8000	M	175	05/81	51	10	61
Burroughs	2500	M	499	02/67	1	2	3
	2700	M	530	08/72	17	15	32
	2800	M	471	12/76	160	100	260
	2900	M	533	07/80	385	225	610
	2925	M	369	03/83	450	350	800
	3500	M	912	05/67	75	50	125
	3700	M	1,230	11/72	100	105	205
	3800	M	705	--/77	160	35	195
	3955	M	778	09/81	205	45	250
	45/4700	M	1,560	10/71	90	45	135
	4800	M	1,440	09/76	315	110	425
	4925	M	500	2Q/84	100	40	140
	4955	M	1,805	08/83	200	105	305
	55/5700	M	1,680	03/63	0	0	0
	5920	M	448	--/82	138	80	218
	5930	M	579	01/81	205	245	450
	A3-D,A3-F	M	270	10/84	20	10	30
	A3-K	M	250	4Q/85	0	0	0
	A9-B	M	0	--/85	0	0	0
	A9-D	M	0	--/85	0	0	0
	A9-F	M	1,200	2Q/84	85	85	170
				TOTAL	2,706	1,647	4,353
Cambex	1636-1	M	100	10/81	6	0	6
	1636-10	M	99	01/83	5	0	5
	1641	M	178	10/80	9	15	24
	1641-11	M	181	--/83	5	9	14
	1651	M	213	--/82	7	7	14
	1651-11	M	256	--/83	4	1	5
				TOTAL	36	32	68
Control Data Corp	180-840	M	760	03/85	0	0	0
	180-850	M	1,115	03/85	0	0	0
	180-860	M	1,575	03/85	0	0	0
	180-990	M	0	06/85	0	0	0
	31/3150	M	419	12/64	10	5	15
	3170	M	970	12/70	5	2	7
	3200	M	625	05/64	6	5	11
	3300	M	1,491	09/65	40	15	55
	3400	M	1,019	11/64	0	0	0
	3500	M	1,341	01/69	20	10	30
	830, 830 Dual	M	395	--/84	2	0	2
	Cyber 170-720	M	1,625	05/79	50	85	135
	Cyber 170-810	M	250	07/84	12	8	20
	Cyber 170-815	M	398	01/83	20	35	55
	Cyber 170-825	M	949	03/82	25	30	55
	Cyber 170-835	M	1,940	03/82	10	15	25
	Cyber 170-845	M	1,632	12/83	50	40	90
	Cyber 171	M	1,184	08/77	3	32	35
	Cyber 71	M	1,111	07/76	0	0	0
	Cyber 72	M	1,810	10/71	4	12	16
	G-20	M	830	04/61	1	0	1
	Omega 480-1	M	376	06/77	20	0	20
	Omega 480-2	M	391	08/78	30	3	33
	Omega 480-3	M	448	01/80	30	2	32
				TOTAL	338	299	637
Convex Computer	C-1	M	890	11/84	4	0	4
Data General	Eclipse C/300, 330	M	150	02/75	723	175	898
	Eclipse C/350	M	180	11/78	560	190	750
	Eclipse M/600	M	215	05/78	235	90	325
	Eclipse MV/10000	M	520	--/83	460	130	590
	Eclipse MV/6000	M	200	02/82	365	150	515
	Eclipse MV/8000	M	300	10/80	930	540	1,470
	Eclipse S/250	M	150	11/78	645	345	990
	MV/10000 SX	M	550	03/85	0	0	0
				TOTAL	3,918	1,620	5,538

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MEDIUM-SCALE COMPUTER CENSUS AS OF JANUARY 1, 1985
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NAME OF MANUFACTURER	COMPUTER MODEL	SIZE CLASS	PURCHASE PRICE IN DOLLARS (000) BASIC AVERAGE	DATE OF FIRST INSTALLATION	NUMBER INSTALLED IN U.S.	NUMBER INSTALLED OUTSIDE U.S.	TOTAL NUMBER INSTALLED
Digital Equipment Corp.	1040/50	M	694	10/67	35	15	50
	1060/70	M	880	06/72	60	30	90
	2040/50	M	756	06/76	50	25	75
	2060	M	1,013	07/79	265	135	400
	PDP-15 XVM	M	82	02/70	350	127	477
	PDP-6	M	400	10/64	0	0	0
	VAX 11/785	M	440	--/84	600	100	700
	VAX 8600	M	0	--/85	0	0	0
	VAX-11/750	M	100	--/80	9,300	7,040	16,340
	VAX-11/780	M	320	05/78	6,700	4,650	11,350
	VAX-11/782	M	600	--/82	190	120	310
				TOTAL	17,550	12,242	29,792
Digital Scientific Corp.	Meta 4/5030	M	150	06/79	8	1	9
Elxsi	Elxsi 6400	M	475	12/83	32	8	40
Flexible Computer	Flex/32	M	126	--/85	0	0	0
Formation	F/4000	M	134	08/81	53	22	75
Global U.S.I.	M80/3	M	195	01/79	12	1	13
	M80/30	M	89	08/81	21	0	21
	M80/30E	M	117	12/81	1	0	1
	M80/31	M	140	06/80	70	5	75
	M80/4	M	310	12/78	20	2	22
	M80/43	M	254	03/81	55	5	60
	USE 44	M	210	07/84	3	2	5
	USX 40	M	150	07/84	25	0	25
	USX 43	M	185	07/84	19	0	19
	USX 46	M	250	07/84	3	0	3
				TOTAL	229	15	244
Gould Computer Systems	32/75,/77	M	150	03/78	1,140	279	1,419
	32/87	M	400	11/81	332	80	412
	32/97	M	450	--/84	80	20	100
	Concept 32/67	M	250	04/83	200	50	250
	Powernode 6000	M	250	02/84	10	5	15
	Powernode 9000	M	450	06/84	7	3	10
				TOTAL	1,769	437	2,206
Harris	H100	M	150	01/71	755	33	788
	H1000	M	525	06/84	40	10	50
	H300	M	200	09/81	85	17	102
	H500	M	250	01/79	375	81	456
	H700	M	175	03/83	401	84	485
	H80	M	100	02/81	80	28	108
	H800 Series	M	275	03/80	555	65	620
	Mind	M	140	08/82	180	85	265
	Series 100	M	190	10/75	35	1	36
	Series 1X5	M	175	09/77	85	15	100
	Series 200	M	240	10/75	48	1	49
	Series 5X0	M	300	12/78	88	8	96
	Slash 7	M	180	10/75	5	0	5
				TOTAL	2,732	428	3,160
Hewlett-Packard	3000 I, II	M	200	11/72	350	250	600
	3000 III	M	200	06/78	2,220	970	3,190
	3000-48	M	194	12/83	1,700	1,340	3,040
	3000-64	M	325	01/82	945	696	1,641
	3000-68	M	375	12/83	480	380	860
				TOTAL	5,695	3,636	9,331
HIS	(GE) 3010/3012	M	90	05/70	3	1	4
	116/316/416/516	M	62	10/66	140	90	230
	6/43,47,53,57,48, 54,74,76	M	177	01/77	7,150	5,721	12,871
	6/75	M	155	3Q/83	210	180	390
	6/92,96	M	552	10/81	177	246	423
	6/95	M	220	3Q/83	140	110	250
	Comshare/Xerox	M	612	06/79	13	0	13
	DPS 7	M	512	--/81	130	687	817
	DPS 8/20	M	563	04/80	40	15	55
	DPS 8/44	M	881	01/80	65	45	110
	DPS 8/44 Dual	M	1,224	--/83	11	3	14
	DPS 8/47	M	510	03/83	70	35	105
	DPS 8/49	M	816	03/83	60	35	95
	DPS 8/52	M	2,034	11/80	91	86	177
	DPS 8/62	M	2,401	12/81	28	9	37
	G-200	M	425	04/61	25	5	30
	G-400	M	700	05/64	45	45	90
	G-6023/25	M	1,490	11/73	5	6	11
	G-6030/40	M	1,900	06/71	5	40	45
	Gamma-30	M	425	02/62	0	0	0
	H-1015/2015	M	805	02/71	5	4	9
	H-1200	M	629	02/66	50	15	65
	H-125	M	365	12/67	2	10	12
	H-2040	M	595	04/72	30	25	55
	H-2050/60	M	920	04/72	60	40	100
	H-2070	M	1,600	05/72	10	0	10
	H-2200	M	862	01/66	20	5	25
	H-3200	M	1,225	02/70	25	10	35
	H-4/1400	M	560	12/61	3	2	5
	H-4200	M	1,920	09/68	0	0	0
	H-64/300	M	413	04/79	90	810	900
	H-66/05/07	M	920	10/76	35	70	105
	H-66/10/17	M	1,504	06/75	23	60	83
	H-66/20/27	M	2,025	11/74	50	100	150
	H-66/440/520	M	932	12/79	70	35	105
	H-8/1800	M	1,500	12/60	2	0	2
	H-Level 64	M	605	10/74	208	900	1,108
				TOTAL	9,091	9,445	18,536

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MEDIUM-SCALE COMPUTER CENSUS AS OF JANUARY 1, 1985
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NAME OF MANUFACTURER	COMPUTER MODEL	SIZE CLASS	PURCHASE PRICE IN DOLLARS (000) BASIC AVERAGE	DATE OF FIRST INSTALLATION	NUMBER INSTALLED IN U.S.	NUMBER INSTALLED OUTSIDE U.S.	TOTAL NUMBER INSTALLED
IBM	1410	M	800	11/61	4	1	5
	1460	M	460	10/63	5	1	6
	360/30	M	528	06/65	180	60	240
	360/40	M	895	06/65	200	65	265
	360/44	M	880	07/66	15	5	20
	360/50	M	1,550	08/65	90	30	120
	370/125	M	652	06/78	90	240	330
	370/135	M	960	05/72	180	165	345
	370/138	M	997	11/76	350	560	910
	370/145	M	1,871	07/71	150	155	305
	370/148	M	1,700	03/77	400	430	830
	4331-2/11	M	394	03/82	2,200	1,675	3,875
	4341-1/9/10	M	830	10/79	4,200	4,600	8,800
	4341-2/11/12	M	969	03/81	4,000	2,400	6,400
	4361-4,-5	M	465	--/84	1,200	1,100	2,300
	4381-2, 1	M	900	--/84	1,900	500	2,400
	7010	M	1,200	10/63	0	0	0
	7040/44	M	1,439	06/63	0	0	0
	7070/74	M	1,299	03/68	0	0	0
	System 38-7	M	405	06/82	1,000	980	1,980
	System 38-8	M	408	07/83	1,000	860	1,860
				TOTAL	17,164	13,827	30,991
IPL	4436	M	176	11/80	16	0	16
	4443	M	223	03/80	35	0	35
	4445	M	385	12/82	3	0	3
	4446	M	313	12/81	115	16	131
	4460	M	400	--/83	22	3	25
				TOTAL	191	19	210
McDonnell Douglas Computer Systems	9000	M	150	--/81	510	90	600
	9100	M	175	01/85	0	0	0
	9208	M	300	10/84	50	0	50
				TOTAL	560	90	650
MDS Qantel	64 Series	M	225	04/83	230	45	275
Modular Computer Systems	Classic 32/85	M	306	--/84	15	20	35
	Classic 7870	M	159	08/78	410	155	565
	Classic II/75	M	156	05/82	233	122	355
	Modcomp IV	M	100	05/74	339	130	469
				TOTAL	997	427	1,424
Motorola/Four Phase	5000 Series	M	200	02/84	50	30	80
	System 311	M	265	02/81	145	15	160
	System 312	M	320	12/81	52	8	60
	Two PI V/32	M	125	06/78	80	6	86
				TOTAL	327	59	386
NAS	7020/30	M	836	01/79	0	6	6
	AS/3	M	624	11/78	20	25	45
	AS/3000	M	331	01/80	35	0	35
	AS/4	M	916	06/77	10	4	14
	AS/5000	M	608	02/80	70	50	120
	AS/6100	M	474	10/82	3	5	8
	AS/6620	M	373	--/83	52	22	74
	AS/6630	M	496	--/83	21	70	91
	AS/6650	M	618	--/83	53	38	91
	AS/6660	M	475	10/84	2	0	2
				TOTAL	266	220	486
NCR	315 RMC	M	500	09/65	0	0	0
	8560	M	745	11/77	35	23	58
	8565	M	585	04/79	90	145	235
	8565 II	M	469	04/82	75	94	169
	8570	M	953	05/76	80	75	155
	8575	M	729	04/79	95	70	165
	8575 II	M	548	05/82	59	68	127
	8580	M	1,734	12/78	4	8	12
	8585	M	1,472	08/79	30	50	80
	8585 II	M	585	05/82	34	33	67
	8595 II	M	742	05/82	36	37	73
	8635,8645,8655	M	1,300	--/83	47	29	76
	Century 200	M	367	09/69	25	28	53
	Century 201	M	590	09/69	45	48	93
	Century 251	M	1,005	11/73	5	8	13
	Century 300	M	1,426	02/72	26	32	58
				TOTAL	686	748	1,434

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MEDIUM-SCALE COMPUTER CENSUS AS OF JANUARY 1, 1985
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NAME OF MANUFACTURER	COMPUTER MODEL	SIZE CLASS	PURCHASE PRICE IN DOLLARS (000) BASIC AVERAGE	DATE OF FIRST INSTALLATION	NUMBER INSTALLED IN U.S.	NUMBER INSTALLED OUTSIDE U.S.	TOTAL NUMBER INSTALLED
Norsk Data North American	ND-500 Series	M	220	10/84	50	530	580
Perkin-Elmer	3200MPS	M	246	--/83	100	18	118
	3240	M	159	10/79	348	94	442
	3250/XP	M	228	02/82	277	148	425
	8/32	M	206	06/75	879	286	1,165
	Cadam	M	220	05/78	75	5	80
				TOTAL	1,679	551	2,230
Prime	500	M	330	06/76	40	40	80
	550	M	150	02/79	950	625	1,575
	550 II	M	110	07/81	565	265	830
	650	M	165	02/79	80	55	135
	750	M	270	07/79	1,270	450	1,720
	850	M	370	07/81	305	120	425
	9650	M	146	02/84	100	50	150
	9750	M	252	07/84	150	75	225
	9950	M	520	08/83	455	245	700
	9955	M	600	01/85	0	0	0
				TOTAL	3,915	1,925	5,840
Pyramid Technology Corp.	90MX	M	0	01/85	0	0	0
	90X	M	300	--/84	80	20	100
				TOTAL	80	20	100
Sperry Univac	1100/10	M	2,094	04/76	50	70	120
	1100/20	M	2,850	04/75	2	10	12
	1100/60	M	1,941	03/80	600	1,017	1,617
	1100/70/71	M	500	--/84	137	193	330
	301	M	295	10/60	2	0	2
	3301	M	1,021	06/64	8	0	8
	418 I, II	M	450	06/63	28	25	53
	418 III	M	1,700	06/69	0	20	20
	491/492	M	1,150	12/61	0	0	0
	501	M	695	06/59	0	0	0
	90/40	M	765	06/78	85	130	215
	90/60	M	1,184	01/74	90	100	190
	90/70/9700	M	1,275	08/72	4	15	19
	90/80	M	3,254	12/76	80	50	130
	9400/80	M	530	05/69	80	50	130
	III	M	1,134	08/62	5	1	6
	Spectra 70/2	M	620	07/71	0	0	0
	Spectra 70/3	M	1,040	10/71	0	0	0
	Spectra 70/35	M	634	01/67	11	2	13
	Spectra 70/45	M	1,181	11/65	25	0	25
	Spectra 70/46	M	1,963	11/68	0	0	0
	Spectra 70/55	M	1,800	11/68	0	0	0
				TOTAL	1,207	1,683	2,890
Stratus Computer	FT 200	M	200	02/82	187	67	254
	FT 240	M	220	03/84	4	1	5
	XA 400	M	275	10/84	8	3	11
	XA 440	M	300	03/84	6	1	7
	XA 600	M	350	05/84	27	14	41
				TOTAL	232	86	318
Synapse	N+1	M	600	12/82	8	0	8
Tandem	Non Stop, Nonstop II, TXP	M	170	05/76	6,475	2,360	8,835
Wang	VS-300	M	310	--/85	0	0	0
	VS-100	M	270	01/81	1,026	730	1,756
	VS-90	M	166	01/82	670	320	990
				TOTAL	1,696	1,050	2,746
Xerox	550/560	M	631	11/74	14	1	15
	940	M	1,040	04/66	25	0	25
	Sigma 5	M	585	08/67	25	3	28
	Sigma 6	M	1,030	11/70	10	5	15
	Sigma 7	M	1,170	12/66	15	2	17
	Sigma 8	M	920	09/71	0	0	0
				TOTAL	89	11	100
				GRAND TOTAL	82,822	55,537	138,359

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SMALL-SCALE COMPUTER CENSUS

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Census of top ten small-scale computer vendors, by dollar value of 1984 worldwide shipments. Small-scale computer systems generally range from 2-16 users in typical commercial applications. Representative systems include the IBM S/36, DEC PDP-11 and Vax 730, and systems such as those from Altos. Average systems prices are normally in the $10,000 to $100,000 range.

Name of Manufacturer	Computer Model	New Size Class	Average Purchase Price ($K)	Date of 1st Install.	Number Installed in U.S.	Number Installed Outside U.S.	Total Number Installed
IBM	1130	S	120	02/66	345	185	530
	1401	S	178	09/60	180	20	200
	1401 G-H	S	106	05/64	0	0	0
	1440	S	227	04/63	8	3	11
	1620	S	130	09/60	12	5	17
	360/20	S	136	12/65	190	70	260
	360/22	S	185	07/71	5	3	8
	360/25	S	391	10/68	12	40	52
	370/115	S	480	04/74	70	320	390
	4321, 4331-1	S	229	03/82	4,000	3,000	7,000
	8100	S	143	08/79	7,000	5,500	12,500
	Series 1	S	31	11/76	46,000	18,500	64,500
	SYS/23 Datamaster	S	13	07/81	25,700	9,000	34,700
	System 3-10	S	123	01/70	1,575	500	2,075
	System 3-12	S	184	03/78	500	520	1,020
	System 3-15	S	341	03/74	1,600	810	2,410
	System 3-4	S	62	06/76	40	20	60
	System 3-6	S	76	12/70	175	45	220
	System 3-8	S	107	06/75	310	410	720
	System 38-3	S	149	07/80	850	690	1,540
	System 38-4	S	160	08/81	1,800	1,625	3,425
	System 38-5	S	298	07/80	4,550	3,550	8,100
	System 38-6	S	120	06/84	1,200	75	1,275
	System/32	S	42	03/75	3,600	3,500	7,100
	System/34	S	65	12/77	33,000	25,500	58,500
	System/36	S	57	10/83	20,000	16,000	36,000
				TOTAL	152,722	89,891	242,613
Digital Equipment Corp.	2020	S	333	07/78	230	190	420
	MICRO PDP #11/SV	S	6	06/85	0	0	0
	MICRO PDP-11/73	S	25	12/84	24	0	24
	PDP 11/03,23 LSI-11	S	10	06/75	76,300	45,000	121,300
	PDP-11/04,05,10,15, 20	S	17	03/70	32,480	18,170	50,650
	PDP-11/24	S	37	10/81	7,760	6,930	14,690
	PDP-11/34, 35, 40	S	40	01/73	32,505	24,000	56,505
	PDP-11/44	S	60	06/79	17,200	10,295	27,495
	PDP-11/45, 50, 55	S	91	04/72	3,800	1,180	4,980
	PDP-11/60	S	75	06/77	1,185	1,085	2,270
	PDP-11/70	S	175	07/75	8,270	3,650	11,920
	PDP-11/84	S	20	06/85	0	0	0
	PDP-12	S	46	04/69	200	15	215
	PDP-8/a, e, f, m	S	15	04/71	42,000	20,900	62,900
	PDP-8/i, l, s	S	27	05/65	500	300	800
	PDP-9,9L	S	50	12/66	0	5	5
	VAX-11/725	S	30	10/83	650	450	1,100
	VAX-11/730	S	42	06/82	3,200	2,350	5,550
				TOTAL	226,304	134,520	360,824
Hewlett-Packard	1000-A/600	S	20	02/82	7,820	4,850	12,670
	1000-A/700	S	30	02/82	1,414	986	2,400
	1000-A/900	S	50	02/82	2,605	1,735	4,340
	1000-E (MX-E)	S	41	01/77	15,363	15,337	30,700
	1000-F	S	56	09/78	5,961	4,426	10,387
	1000-L, XL	S	10	06/79	1,830	1,560	3,390
	1000-M (MX-M, K)	S	26	06/74	8,556	6,687	15,243
	2100A	S	15	06/71	2,520	1,810	4,330
	2100S	S	36	08/73	635	810	1,445
	2114/15/16	S	29	11/66	1,110	205	1,315
	260-15	S	0	06/85	0	0	0
	260-24	S	0	06/85	0	0	0
	260-55	S	0	06/85	0	0	0
	300	S	58	09/79	190	280	470
	3000-30	S	80	10/79	1,067	455	1,522
	3000-33	S	122	01/79	728	300	1,028
	3000-40	S	100	11/81	1,686	1,274	2,960
	3000-42	S	113	12/83	543	428	971
	3000-44	S	170	03/81	2,790	760	3,550
	9020, 9030, 9040	S	35	01/83	3,000	2,000	5,000
	250	S	28	09/78	2,319	4,759	7,078
	3000-37	S	35	12/84	118	0	118
	3000-39	S	50	01/83	925	540	1,465
				TOTAL	61,180	49,202	110,382
NCR	315	S	164	05/62	0	0	0
	8130, 40, 50	S	23	02/77	925	3,500	4,505
	8200,30/31,50/51	S	55	09/74	5,800	6,870	12,670
	8270	S	93	11/79	435	640	1,075
	8350	S	164	07/77	20	2	22
	8370	S	287	07/78	4	0	4
	8410	S	160	02/79	105	180	285
	8430	S	264	06/78	75	210	285
	8450	S	386	11/77	110	115	225
	8455	S	275	04/79	192	350	542
	8535 II	S	234	04/82	55	80	135
	8545 II	S	336	04/82	39	70	109
	8550	S	633	04/76	125	90	215
	8555	S	442	04/79	220	215	435
	8555 II	S	426	04/82	240	275	515
	9010	S	18	04/81	184	2,800	2,984
	9020	S	29	03/81	3,480	6,600	10,080
	9040	S	122	05/81	375	1,430	1,805
	9050	S	153	05/81	250	350	600
	9300	S	60	06/83	3,000	2,000	5,000
	Century 100	S	167	09/68	45	40	85
	Century 101	S	214	10/72	145	180	325
	Century 151	S	308	02/75	50	60	110
	Century 50	S	101	02/71	25	0	25
	Century 75	S	122	07/76	12	15	27
	Tower Series	S	29	06/83	2,000	1,000	3,000
	9100	S	23	06/84	200	1,400	1,600
				TOTAL	18,111	28,552	46,663

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Name of Manufacturer	Computer Model	New Size Class	Average Purchase Price ($K)	Date of 1st Install.	Number Installed in U.S.	Number Installed Outside U.S.	Total Number Installed
Data General	DCC-112	S	12	08/70	50	40	90
	DCC-116	S	10	11/71	3,500	900	4,400
	DCC-416/616	S	7	09/75	20	0	20
	DCC-Model 5	S	6	02/76	15	0	15
	Desktop Generation 20	S	10	07/83	7,000	500	7,500
	Desktop Generation 30	S	12	07/83	700	150	850
	Eclipse 280	S	92	06/83	820	430	1,250
	Eclipse C/150	S	122	12/78	510	300	810
	Eclipse MV/4000	S	71	12/82	2,005	975	2,980
	Eclipse S100, 130, 140, AP/130	S	31	02/75	7,110	3,605	10,715
	Eclipse S200, 230	S	56	02/75	4,317	1,519	5,836
	Micronova System	S	9	11/76	3,500	1,370	4,870
	MP 100, 200, MPT 100	S	8	05/79	1,040	280	1,320
	Nova	S	12	02/69	50	10	60
	Nova 1200 Series	S	11	12/70	3,100	1,700	4,800
	Nova 2 Series	S	10	10/73	6,800	2,300	9,100
	Nova 3/12	S	18	01/76	17,070	5,255	22,325
	Nova 3/4	S	10	01/76	3,405	1,070	4,475
	Nova 3/D	S	37	10/76	2,345	2,145	4,490
	Nova 4/C, S, X	S	20	03/79	14,700	9,700	24,400
	Nova 800/820	S	40	03/71	200	110	310
	Nova 830/840	S	44	07/73	100	90	190
	S 20	S	12	06/82	1,490	740	2,230
	S120	S	20	06/82	1,110	720	1,830
	Supernova SC	S	27	04/70	0	2	2
				TOTAL	80,957	33,911	114,868
Texas Instruments	200	S	9	08/82	270	200	470
	300	S	14	01/83	6,200	3,500	9,700
	600	S	40	08/82	4,900	2,425	7,325
	800	S	54	01/83	1,200	570	1,770
	960-A/B	S	30	12/71	2,750	1,860	4,610
	980-A/B	S	40	10/71	2,600	1,800	4,400
	990/10	S	23	03/76	21,815	9,895	31,710
	990/12	S	52	11/79	4,230	2,885	7,115
	990/4	S	8	06/76	8,250	2,930	11,180
	990/5	S	10	03/79	7,685	3,190	10,875
				TOTAL	59,900	29,255	89,155
Wang	2200	S	19	04/73	10,900	9,370	20,270
	2200 SVP, LVP	S	20	09/79	9,130	7,195	16,325
	2200 VP, MVP	S	32	09/76	11,463	9,112	20,575
	VS-15	S	29	08/83	500	300	800
	VS-25	S	46	12/82	1,425	1,340	2,765
	VS-45	S	87	10/82	1,240	1,030	2,270
	VS-80	S	106	07/77	2,435	1,930	4,365
	VS-85	S	73	04/84	300	200	500
				TOTAL	37,393	30,477	67,870
Burroughs	1710	S	132	08/72	155	195	350
	1720	S	350	02/73	100	95	195
	1815/25/30	S	130	05/77	170	305	475
	1855/60/70/85	S	271	05/77	710	225	935
	1905	S	106	04/80	245	140	385
	1955/1985	S	208	04/80	2,155	1,645	3,800
	1990	S	120	11/83	675	875	1,550
	2/3/500	S	317	11/61	30	15	45
	B700	S	68	03/73	1,400	1,200	2,600
	B80, B90	S	30	11/76	11,440	17,160	28,600
	B800	S	51	05/77	5,100	2,750	7,850
	B900	S	78	08/80	2,595	1,305	3,900
	XE 520,550	S	70	03/84	180	120	300
				TOTAL	24,955	26,030	50,985
Sperry Univac	1004	S	49	02/63	25	10	35
	1005	S	91	04/66	20	0	20
	1050	S	380	09/63	30	8	38
	520I	S	13	09/68	0	0	0
	620/L+100C	S	12	02/71	110	320	430
	620/L-100	S	14	06/72	880	420	1,300
	620/a	S	75	12/65	0	0	0
	620/f,f-100	S	12	02/71	15	20	35
	620i	S	29	12/65	25	60	85
	90/25	S	199	06/77	20	50	70
	90/30	S	428	02/75	590	960	1,550
	9200	S	104	06/67	300	200	500
	9300	S	212	09/67	200	100	300
	BC-7	S	46	04/77	2,160	1,170	3,300
	R622/1	S	20	12/69	5	0	5
	S/80-3-4	S	145	12/81	500	710	1,210
	S/80-5-6	S	216	12/82	320	350	670
	Spectra 1600	S	189	01/71	12	0	12
	Spectra 70/15	S	203	09/64	0	0	0
	Spectra 70/25	S	343	09/65	0	0	0
	SS 80/90	S	357	08/58	0	0	0
	Sys/80-8	S	440	06/83	140	210	350
	UTS 4020	S	26	06/81	1,650	650	2,300
	UTS 4040	S	37	06/81	270	370	640
	V-72	S	45	02/74	770	370	1,140
	V-73	S	45	11/72	540	285	825
	V-74	S	80	05/74	50	15	65
	V-75	S	80	08/75	10	5	15
	V-76	S	16	01/76	675	260	935
	V-77-200	S	7	01/76	860	330	1,190
	V-77-400	S	28	12/77	275	180	455
	V-77-500	S	60	03/81	95	95	190
	V-77-600	S	66	03/77	1,220	490	1,710
	V-77-700	S	92	03/81	50	82	132
	V-77-800	S	97	03/79	757	524	1,281
	Mapper 10, Sys.11	S	200	--/84	66	78	144
	Mapper 5	S	50	--/84	300	300	600
				TOTAL	12,940	8,622	21,562
Altos Computer	186/486	S	9	07/84	1,000	200	1,200
	8000 Series	S	9	06/77	19,877	12,674	32,551
	ACS 586/986 Series	S	11	01/83	11,700	4,800	16,500
	ACS 68000	S	15	10/82	700	400	1,100
	ACS 8600-12, 14	S	14	01/82	1,000	400	1,400
	Series 5/580-20, 40, E Series	S	8	11/81	10,500	6,500	17,000
				TOTAL	44,777	24,974	69,751

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REVIEW & FORECAST
Part I

"The Gray Sheet"

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EDP industry report

● THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

D.C.BELLOMY, ASSOC.ED. JULY 1, 1985 ● VOL.21, NO.4 P.J.MCGOVERN, PUBLISHER

IDC INTERNATIONAL DATA CORPORATION

VIEW FROM THE VALLEY: LARGE-SCALE SYSTEMS COMING OFF SLOWER GROWTH, FACING LOWER INCOME LEVELS IN 1985 DESPITE CONTINUING DEMAND

The shortest answer to the question about what has hit the computer industry is that there is no short answer. Issues differ in each segment of the market, with varying mixes of secular and cyclical trends, of accident and design. For large-scale systems, the dominant flavors in the bouillabaisse are cyclical and designed: a slowing tempo last year as the market for the 308X line and its rivals matured, and drops in demand this year during the transition to Sierra.

IDC forecasts for 1985 indicate a repeat of the weak sales during the 308X transition in 1981, when the majestic march of the mainframes was temporarily sidetracked with a 36.6% fall in large-system unit shipments and a 21.8% dip in revenue. However, financial officers will be smiling more starting next year:

- The $16.1 billion in large-scale revenue rung up in 1984 represented an increase of 11.1% over 1983, after a gain of 30.1% in 1983 over 1982 and 80.9% in 1982 over 1981.
- Large-scale shipments in 1985 should dip to 2,850 units, down 24.2% from 1984, while sector revenue should slip 15.5% to $13.6 billion.
- With mainframe shipments plummeting 45.7% from 2,533 units in 1984 to an estimated 1,375 in 1985, IBM large-scale revenues will be distinctly smaller-scaled at around $9.6 billion.
- Next year's new IBM large-scale shipments will probably only reach some 1,800 units, but since over three-quarters will be expensive Sierra boxes, the bottom line will be much healthier.
- Reflecting this turnaround, overall large-scale revenue of U.S. vendors should reach $18.3 billion next year, up 34.6% from 1985 and 13.7% from 1984.
- The installed base of large-scale systems should grow at a compound annual growth rate of 7.3% from 1984 through 1989.

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All in all, during the decade of the Eighties (1980-89), there will have been approximately 33,270 large-scale shipments worth $151.3 billion.

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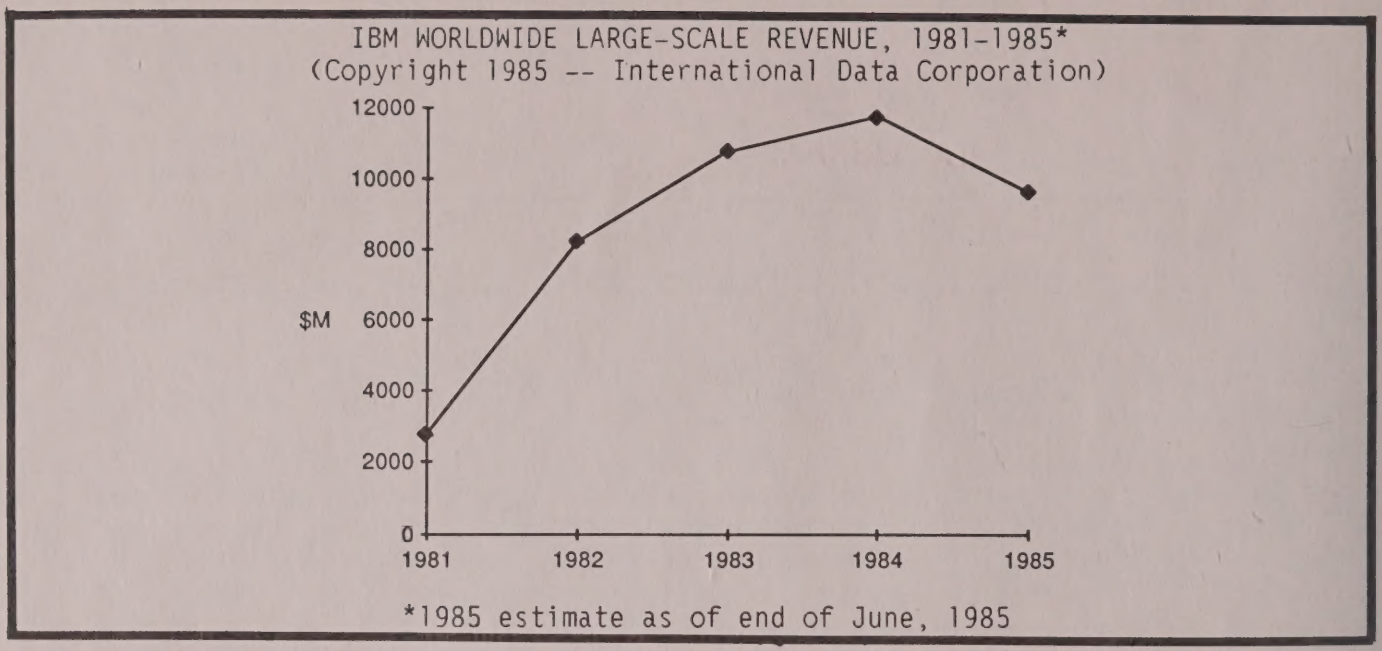

With profit margins high on large-scale systems, any growth engorges a company's coffers. A lot of money was made in 1984 by the manufacturers servicing this sector -- IDC estimates over $16 billion for 3,760 units plus peripherals split among eleven vendors. But different vendors got very different splits:

- IBM continued to lord it over other large-scale vendors, with 67.4% of mainframe computers sold and 76.1% of total value received. However, its large-scale sales growth did not quite match its rivals': revenue of $11.748 billion meant an increase of 9.2% over 1983.

- The PCM proportion of large-scale revenue stayed put at around 13%, with little movement in the rankings by either Amdahl or NAS.

- The Bunch registered impressive gains in mainframe revenue: up 31.4% over 1983. Noteworthy growth was registered by Burroughs (up 67.7% in large-scale sales) and Sperry (45.9%), but Honeywell and CDC trailed the industry average at 5.5% and 2.4% respectively.

Last year's figures represent the growing maturation of IBM's 308X family, just as some of Burroughs' and Sperry's spurt reflected delays in coming up with meaningful high-end competition. Announcement of IBM's 3090 generation of mainframes was probably timed to squeeze as much cash from its predecessor as possible. However, now that Sierra is official, squeezing much more money out looks like a blood and turnips proposition. For 1985 IBM should make fully half as much money on 308X upgrades ($930 million) as on new 308X systems.

As much as ever before, as IBM goes, so goes the large-scale computer industry. True, its 73.0% of large-scale system revenues (including peripherals) in 1984 seems a retreat of a few inches from 1983's 74.2%, but with that high a market share, its ups and downs will continue to define the health of the entire mainframe sector (compare the graph on the following page). Moreover, potential competition has yet to appear that could break IBM's full-nelson on mainframe money, particularly with the demise of Trilogy. But the other ten large-scale vendors still jockey for position to challenge Big Blue.

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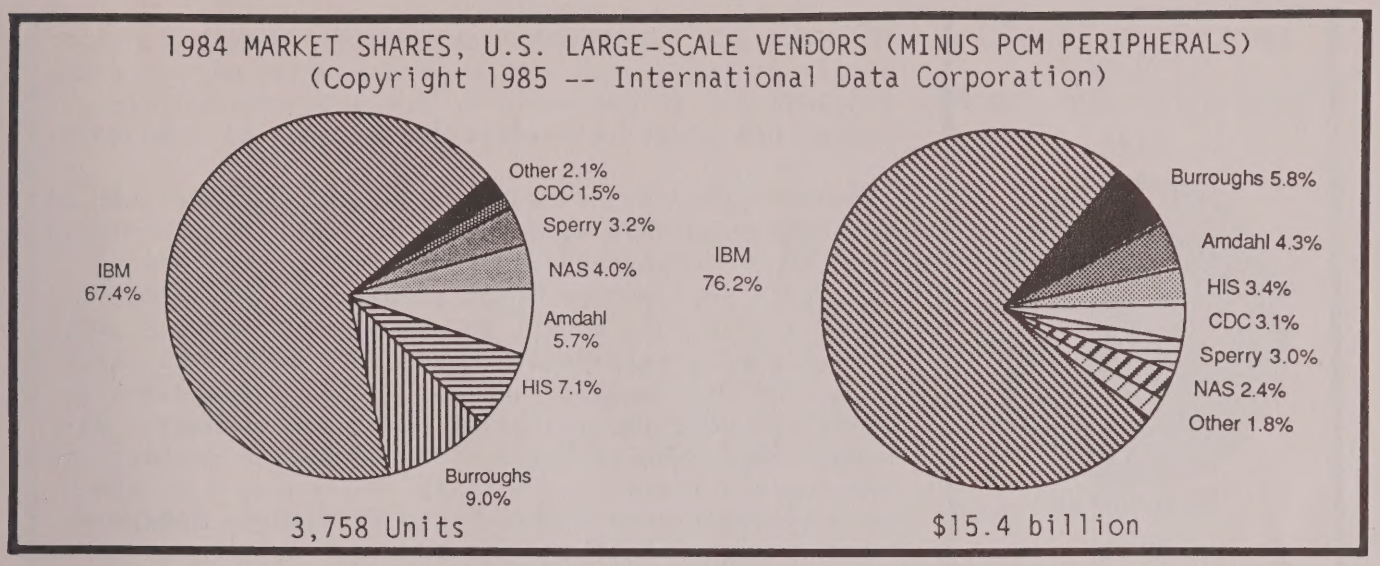
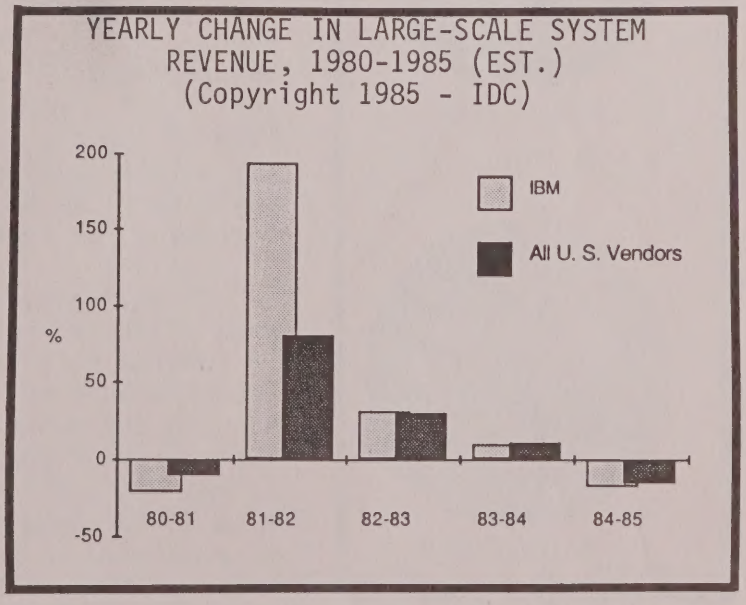


For several years now, the most viable alternative has been Japan, Inc., which in the U.S. means the PCMs. The purest PCM right now seems to be NAS, which is still completely dedicated to translating Hitachi engineering expertise into slightly less pricey IBM-compatible products. Its share of the market in 1984 is not overwhelming (2.3% of large-scale revenues), but the record revenue generated by NAS has just kept National Semi from plummeting far below the net loss of $2.7 million registered during the fiscal year just ended. NAS's prospects look fairly roseate right now, especially with the appearance of its AS/XL Sierra-class systems and double-density disks in 2Q 1986.

With 4.1% of large-scale revenue in 1984, Amdahl as usual did better than NAS. However, its activities so far in 1985 raise two questions about its future as a PCM. First there's the lack of activity in Sierra-class systems. The latest word, though, is that the Fujitsu-Amdahl combine will have a machine on the market in time to compete with NAS and IBM, but that its announcement will be delayed until shortly before delivery to avoid the delays and disappointed users that have harmed Amdahl's reputation in the past.

The second question is, plug-compatible with whom? Increasingly Amdahl has been cuddling up to AT&T and the Unix universe. On July 1 a multi-year agreement was announced whereby AT&T's Large Business Systems division will use Amdahl data communications products and systems. Later in the month word of close ties in Unix development is expected. It hardly matters whether AT&T is looking to pick up any of the Amdahl stock that Fujitsu doesn't own (it probably isn't) -- a working relationship is developing between Amdahl and AT&T, and hence between IBM plug-compatibility and Unix on the mainframe plane.



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IBM SHARE OF LARGE-SCALE MARKET
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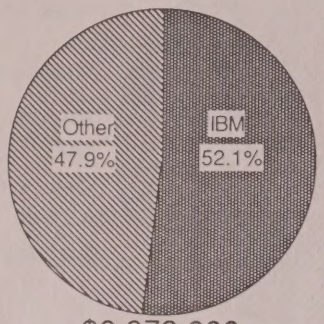
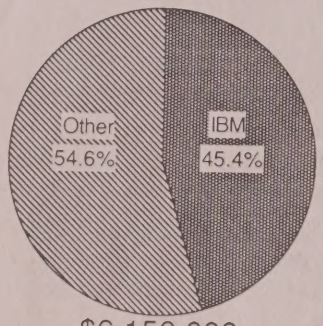
1980



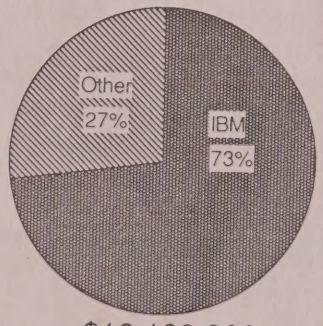
$6,872,000

1981



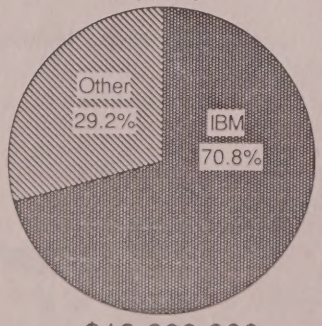
$6,156,000

1984



$16,100,000

1985
(est.)



$13,600,000

Last year the Bunch looked like a dumbbell, with bulges at the growth and no-growth extremes and precious little in between. To the extent Bunch prospects look good, it's individually, not as a bunch.

Burroughs is in the midst of a turnaround such as few companies have been able to achieve in the highly volatile information processing field. In 1984 it surpassed Sperry-Univac in large-scale installed base, and in 1985 sought to add Sperry's to its own. Its lack of success casts some doubt on the business acumen of its leaders, but not on its assumptions about the relative status of the two companies. Although Burroughs is still boxed in by the problem of IBM-compatability, its ability to come up with the only Sierra alternative engineered without Japanese knowhow augurs well for the future.

Sperry's expansion in large-scale revenues in 1984 was second proportionately only to Burroughs', but its 1983 base was particularly abysmal. Sperry mainframe revenue last year was still less than two thirds what it was in 1981. Nevertheless, Sperry feels that it has something to bring to a well-heeled partner. Rumors still race around Ford, although some would like more communications synergy.

Honeywell has been treading water, but may get back in the swim with a Japan, Inc. strategy. Its developing relationship with NEC could provide much-needed support.

Control Data once seemed a brilliant strategist for backing up its prowess in number-crunching with peripherals and services. Maybe it would have been if large-system stagnation were not accompanied by Japanese peripherals competition and a services slowdown. On July 1 CDC announced the sale of its Brokerage Transaction Services unit to ADP and promised additional "fundamental changes -- including divestiture of certain assets -- that will help us to solidify market positions." But it needs to do more than solidify -- it needs to find ways to grow again like Burroughs, or seek help like Sperry and Honeywell.

These, then, are IBM's rivals. The PCMs might gain a little ground during the Sierra turmoil, but it remains to be seen how different things will be when the dust settles. In 1981 the 308X transition boosted the market shares of IBM's competitors. Yet the next year IBM not only regained the market share it had lost, but immediately leapt to the 70+% position it has held ever since. That kind of domination is very hard to shake: despite its large-scale travails in 1985, IBM should still get 70% of sales.

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ABOUT THE NEW DEFINITIONS

Long time readers of the Gray Sheet are reminded that new classifications have been in use since last year's Review and Forecast issues:

- Large-Scale systems. The very largest computers available from traditional mainframe and supercomputer vendors, large systems are expected to support over 128 users in many commercial environments and to bear average prices of more than $1 Million.

- Medium-Scale systems. Generally supporting 17-128 users in normal commercial environments, these include the IBM 4300 line, mid-range systems from Bunch companies, and the high end from DEC, DG, Prime, etc. System prices typically range from $100,000 to $1 Million.

- Small-Scale Systems. Generally ranging from 2-16 users in typical commercial applications and from $10,000-100,000 in price, these include the IBM S/36, DEC PDP-11 and Vax 730, and Altos-like systems.

VALUE OF WORLDWIDE SHIPMENTS OF LARGE-SCALE COMPUTERS
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	1984		1983		1982		1981	
	$M	%	$M	%	$M	%	$M	%
IBM	11,748	73.0	10,755	74.2	8,211	73.7	2,796	45.4
Amdahl	659	4.1	585	4.0	344	3.1	281	4.6
NAS	375	2.3	335	2.3	225	2.0	122	2.0
PCM Periph.	686	4.3	701	4.8	816	7.3	700	11.4
IBM Base	13,468	83.7	12,376	85.4	9,596	86.2	3,899	63.3
Burroughs	894	5.6	533	3.7	177	1.6	531	8.6
CDC	479	3.0	468	3.2	394	3.5	370	6.0
Cray	165	1.0	125	0.9	122	1.1	91	1.5
DEC	85	0.5	174	1.2	276	2.5	65	1.1
Denelcor	4	0.0	2	0.0	6	0.1	0	0.0
Honeywell	522	3.2	495	3.4	206	1.8	458	7.4
NCR	25	0.2	0	0.0	24	0.2	0	0.0
Sperry	458	2.8	314	2.2	335	3.0	742	12.0
Non-IBM Base	2,632	16.3	2,111	14.6	1,540	13.8	2,257	36.7
TOTAL	16,100	100.0	14,487	100.0	11,136	100.0	6,156	100.0

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LARGE-SCALE COMPUTER MARKET -- U.S.-BASED MANUFACTURERS
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	Number of Systems Shipped	Cumulative Number in Use	$ Million Value Shipped	$ Billion Value in Use
		WORLDWIDE		
1980	2,380	14,170	6,890	60.3
1981	1,510	14,430	5,390	61.8
1982	2,320	15,180	11,060	68.3
1983	3,360	16,550	14,890	78.8
1984	3,760	18,150	16,090	91.1
1985	2,850	19,180	13,600	95.6
1986	3,580	20,610	18,300	104.1
1987	4,570	22,330	21,600	111.2
1988	4,720	24,200	22,100	120.0
1989	4,220	25,800	19,600	130.6
1990	5,000	27,700	24,300	140.7
		UNITED STATES		
1980	1,320	7,880	3,810	34.2
1981	890	8,290	3,130	36.3
1982	1,500	8,790	6,720	41.1
1983	1,830	9,460	8,340	46.3
1984	2,250	10,570	9,010	54.3
1985	1,530	11,100	7,300	57.1
1986	2,180	11,800	10,900	61.6
1987	2,790	12,800	13,100	65.3
1988	2,810	13,900	13,000	69.9
1989	2,420	14,800	10,900	76.2
1990	2,900	15,900	13,900	82.1
		INTERNATIONAL		
1980	1,060	6,290	3,080	26.1
1981	620	6,140	2,260	25.5
1982	820	6,390	4,340	27.2
1983	1,530	7,090	6,550	32.5
1984	1,510	7,580	7,080	36.8
1985	1,320	8,080	6,300	38.5
1986	1,400	8,810	7,400	42.5
1987	1,780	9,530	8,500	45.9
1988	1,910	10,300	9,100	50.1
1989	1,800	11,000	8,700	54.4
1990	2,100	11,800	10,400	58.6

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LARGE-SCALE COMPUTER CENSUS, AS OF JAN. 1, 1985

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Large-Scale Computer Systems. A large-scale system is either a general-purpose computer or a high-speed scientific computer with an approximate system price greater than $1 million. These machines are usually located in a centralized computer room. Representative examples include IBM 303X, 308X, Cray Computer products, and their competitors. Average purchase prices are based on system price including peripherals, except in the case of plug-compatible vendors Amdahl and National Advanced Systems, where only CPU value is counted.

NAME OF MANUFACTURER	COMPUTER MODEL	IDC SIZE CLASS	PURCHASE PRICE IN DOLLARS BASIC AVERAGE	DATE OF FIRST INSTALLATION	NUMBER INSTALLED IN U.S.	NUMBER INSTALLED OUTSIDE U.S.	TOTAL NUMBER INSTALLED
Amdahl	470V/5 II	L	2,350	09/77	18	10	28
	470V/6 II	VL	3,475	06/75	105	40	145
	470V/7,A,B	VL	2,542	09/78	80	60	140
	470V/7C	L	1,172	02/81	35	20	55
	470V/8	VL	2,592	09/79	140	85	225
	580/5840,50,60,67, 70,68	VL	3,500	08/82	250	150	400
	5868,5880	VL	0	--/85	0	0	0
	TOTAL				628	365	993
Burroughs	65/6700	L	3,377	11/69	80	70	150
	6800	L	1,824	06/77	230	90	320
	6900	L	2,373	11/80	118	62	180
	6925	L	1009	--/82	180	165	345
	7700	L	6,864	08/73	37	20	57
	7800	VL	5,396	11/78	152	42	194
	B-7900 FHK	VL	6,732	08/83	138	67	205
	TOTAL				935	516	1,451
Control Data Corporation	1604	L	1,865	01/60	1	0	1
	3600	L	2,246	06/63	4	2	6
	3800	L	2,737	12/65	10	0	10
	6200	L	1,945	11/70	0	0	0
	6400	L	2,902	05/66	30	9	39
	6500	L	3,944	12/67	12	10	22
	6600	VL	5,319	08/64	30	10	40
	6700	VL	6,401	07/70	2	0	2
	7600	VL	8,740	01/69	20	2	22
	CYBER 170-730	L	2,395	06/79	75	50	125
	CYBER 170-740	L	3,241	04/80	10	5	15
	CYBER 170-750	L	4,811	08/79	30	15	45
	CYBER 170-760	VL	6,147	04/79	40	8	48
	CYBER 170-855	L	4,040	11/82	20	15	35
	CYBER 170-865	VL	4,956	--/83	16	9	25
	CYBER 170-875	VL	6,497	--/82	16	9	25
	CYBER 170-875 DUAL	VL	9,209	--/83	3	0	3
	CYBER 172	L	2,138	07/75	12	30	42
	CYBER 173	L	3,553	09/75	7	18	25
	CYBER 174	L	4,453	09/75	10	10	20
	CYBER 175	VL	6,571	08/75	30	20	50
	CYBER 176	VL	8,048	01/78	15	3	18
	CYBER 203	VL	10,160	11/80	2	0	2
	CYBER 205	VL	11,735	01/81	22	7	29
	CYBER 73	L	2,803	03/72	20	25	45
	CYBER 74	VL	5,330	03/72	15	10	25
	CYBER 76	VL	8,426	03/72	5	6	11
	STAR 100	VL	12,240	12/74	0	0	0
	990,990 Dual	L	0	--/85	0	0	0
	TOTAL				457	273	730
Cray	1A, 1B	VL	8,836	04/76	10	7	17
	1S	VL	8,740	11/80	27	11	38
	M	VL	5,330	--/83	4	4	8
	X-MP/48	VL	14,000	06/84	0	0	0
	XMP/1	VL	6,000	08/84	4	1	5
	XMP22, 24	VL	10,659	--/83	12	6	18
	TOTAL				57	29	86
Denelcor	HEP	L	1,326	02/82	10	2	12
Digital Equipment Corp.	1080/90	L	1,419	06/75	450	255	705

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NAME OF MANUFACTURER	COMPUTER MODEL	IDC SIZE CLASS	PURCHASE PRICE IN DOLLARS BASIC AVERAGE	DATE OF FIRST INSTALLATION	NUMBER INSTALLED IN U.S.	NUMBER INSTALLED OUTSIDE U.S.	TOTAL NUMBER INSTALLED
HIS	DPS 8/70	L	3,816	05/80	269	223	492
	DPS 88/41	L	1,850	--/85	0	0	0
	DPS 88/42	L	2,950	--/85	0	0	0
	DPS 88/42 Dual	L	3,700	--/85	0	0	0
	DPS 88/81	VL	6,059	--/83	11	9	20
	DPS 88/82	VL	8,609	--/83	7	3	10
	DPS 88/82T	VL	9,600	--/85	0	0	0
	G-600	L	3,524	04/65	5	5	10
	G-6050/60	L	3,464	07/71	30	35	65
	G-6070/80	L	5,212	07/71	7	13	20
	G-6180	VL	5,144	02/74	2	0	2
	H-66 DPS, BC	L	3,759	07/78	150	209	359
	H-66/40/60	L	3,920	10/74	70	130	200
	H-66/80	VL	6,125	10/74	10	30	40
	H-68/80	VL	5,242	10/74	12	1	13
	H-68/DPS	VL	6,228	09/78	20	8	28
	H-8200	L	3,144	02/69	3	2	5
	TOTAL				596	668	1,264
IBM	3031	L	2,601	03/78	510	665	1,175
	3032	L	4,402	03/78	145	295	440
	3033 UAM	VL	7,770	03/78	800	430	1,230
	3033N	VL	4,110	01/80	220	255	475
	3033S	L	3,603	01/81	80	50	130
	3081D,G,K	VL	7,781	10/81	1,700	1,050	2,750
	3083 B,E,J	L	4,590	01/83	1,850	1,375	3,225
	3084	VL	11,500	01/84	210	110	320
	360/65	L	3,464	11/65	85	15	100
	360/67,75,85,9X, 370/195	VL	7,140	01/66	10	3	13
	370/155	L	3,464	02/71	50	20	70
	370/158	L	5,356	05/73	600	430	1,030
	370/165	VL	6,502	06/71	15	2	17
	370/168	VL	9,646	07/73	200	100	300
	7030	L	1,428	05/61	0	0	0
	7080	L	2,985	08/61	0	0	0
	7090/94	L	3,571	08/60	0	0	0
	TOTAL				6,475	4,800	11,275
NAS	AS/5	L	1,620	03/77	60	50	110
	AS/6	L	2,543	12/78	30	25	55
	AS/7000	L	1,751	04/80	50	42	92
	AS/7031	L	1,382	12/78	15	10	25
	AS/8023	L	699	04/84	4	1	5
	AS/8040	L	1,376	--/83	17	6	23
	AS/8050	L	1,793	--/83	10	5	15
	AS/8060	L	2,296	--/83	6	3	9
	AS/8083	L	3,506	10/84	2	1	3
	AS/9000	VL	4,582	12/80	41	32	73
	AS/9040	VL	2,132	10/82	20	17	37
	AS/9050	VL	2,739	10/82	25	5	30
	AS/9060	VL	3,784	08/82	56	19	75
	AS/9070	VL	4,423	12/82	8	2	10
	AS/9080	VL	5,596	12/82	14	3	17
	TOTAL				358	221	579
NCR	8650	L	1,020	11/81	3	15	18
	8665,8675,8685, 8695	L	3,000	--/84	4	2	6
	8670	L	1,326	05/82	0	7	8
	TOTAL				8	24	32
Sperry Univac	1100/40	L	4,789	07/75	24	26	50
	1100/80/81/82	L	5,806	03/77	250	188	438
	1100/83	VL	9,307	07/78	22	27	49
	1100/84	VL	10,200	11/78	47	26	73
	1100/90/91	L	7,000	--/84	30	38	68
	1106	L	2,047	12/69	30	50	80
	1107	L	2,691	10/62	0	0	0
	1108	VL	3,997	09/65	65	15	80
	1110	VL	6,662	06/72	5	10	15
	494	L	3,411	02/66	43	16	59
	SPECTRA 70/6	L	2,393	10/71	5	0	5
	SPECTRA 70/7	L	2,281	10/71	3	1	4
	SPECTRA 70/60	L	2,393	09/70	3	0	3
	SPECTRA 70/61	L	2,718	03/71	0	0	0
	TOTAL				527	397	924
Xerox	SIGMA 9	L	2,558	11/71	65	25	90
GRAND TOTAL					10,566	7,575	18,141

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"The Gray Sheet"

EDP industry report

● THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

D.C.BELLOMY, ASSOC.ED. JUNE 18, 1985 ● VOL.21, NO.3 P.J.MCGOVERN, PUBLISHER

IDC INTERNATIONAL DATA CORPORATION

SURVEYING SIERRA: USERS SUGGEST SALES WILL MATCH IBM HOPES, AND FEARS

Night's candles are burnt out, and jocund day
Stands tiptoe on the misty mountain-tops.
-W. Shakespeare

Ain't no mountain high enough.
-D. Ross & the Supremes

Even Sierra? The question becomes of critical importance for IBM this year, since as the days get longer the industry's night isn't getting any shorter.

John Akers' acknowledgement that his company's only hope for a semi-respectable year rests on a very aggressive fourth quarter (see the boxed story inside) is an implicit testament to IBM's faith in the 3090. To give himself a little larger window to push profits through, Akers also nudged the official first delivery date for the 3090-200 up from November to October.

To test the validity of IBM's hopes, International Data Corporation conducted a survey of 860 IBM 308X installations over the last two weeks in May. Two questions were asked: "Do you have any 3090s on order?" and "If you don't have 3090s on order, do you plan to order any 3090s?" IDC proceeded on the assumption that waiting a full quarter after the announcement of the 3090 in February would give users sufficient time to make up their minds on Sierra.

If, as IDC believes, the sample of just over a quarter of U.S. 308X sites is representative, IBM's 4Q wager looks good, but it should hedge its bets:

- Over 1,000 3090s have been booked by U.S. users, with about 370 3090-200s on order in this country for 1985.
- This will likely mean approximately 450 orders worldwide for almost $2.5 billion in revenue from Sierra sales in 1985.
- Over half of 3090 orders come from 3081 senior sites, and over half of all 3084 sites are ordering at least one Sierra.
- As a result, however, 308X income is so weak that 3090 sales in 1985 will not compensate for this year's mainframe revenue loss.

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CYCLING AROUND: HOW IBM'S YEAR IS LOOKING

John Akers admitted to Wall Street analysts on June 12 that previous forecasts of "solid growth" in yearly revenue and profits are now inoperative. As quoted in the Wall Street Journal, Akers predicted "earnings growth in the second quarter over the first quarter and third quarter over the second. However, we expect that on the nine-month, year-to-year comparison against 1984, we still won't be even with last year." And so IBM's hopes for 1985 come to ride on "an especially strong fourth quarter."

Akers seemed to want to ascribe as much of the company's current problems as possible to something amorphous called "the economy," rather than, say, the new product syndrome. There are in fact important differences from earlier product cycles -- as late as 1981, when the transition to 308X began, IBM was committed to a narrower range of products, and leased rather than sold computers. Consequently IBM had but a wee cushion when users held off buying large-scale systems in anticipation of new models, and wasn't able to front-load income when users did migrate. By rights the Sierra transition should be gentler than its immediate predecessor, since PCs now offer shelter from the storm (sales in this sector are reportedly up about 20-25%) and the emphasis on sales rather than leases is geared towards upwards migration into new families.

Nevertheless, the new-product syndrome hits harder than IBM's marketing strategy and laudable diversification might suggest. Analysts at IDC and Goldman, Sachs estimate that large-scale sales represented about 25% of IBM's total revenue last year, but accounted for fully 50% of its profits. With mainframe revenues down around 23% so far this year, IBM is less concerned with stalled revenue than with skidding profit margins.

The question, then, is whether or not the post-Sierra, post-double-density 3380 fourth-quarter spurt will be enough to compensate for three supine quarters. The likelihood is that by December IBM revenue growth will be swelling and profits leaping, but neither fast nor far enough to generate the kind of strong year-end numbers that John Akers is talking about. Since it is difficult to see how large-scale revenues can match 1984's, and it is probable that mid-scale systems will still be hunting for some exit from the supermini maze, it increasingly looks as if 1985 will be flat for IBM, Sierra notwithstanding.

PROJECTIONS OF SIERRA ORDERS FROM 308X SITES, BY SITE CLASS
(Copyright 1985 -- International Data Corporation)

Site Class	U.S. Sites	Sites Ordering	Actual Orders 200	Actual Orders 400	Possible Orders 200	Possible Orders 400
3084	280	150	325	85	15	5
3081	1,300	390	580	80	50	10
3083	1,675	70	90	0	15	0
Other	na	35	60	5	5	0
Total		645	1,055	170	85	15

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The demand for Sierra-class computers is undeniable. Major users want them as soon as possible. Not counting "possible" replies to queries on plans to purchase Sierras, seven 3090-200s were on order for the third quarter by survey respondents (presumably early support sites), and 112 for the fourth quarter. User demand and manufacturing supply, however, will not mesh until the first half of 1986, for which IBM has accepted orders from respondents for 171 3090-200s. Another 39 are currently slated for delivery in the second half of 1986. Delivery dates for 23 Sierras were not specified.

Extrapolated into the total U.S. market, the survey responses suggest the following scenario for 3090-200 sales over the next year and a half:

3rd Quarter 1985	20	
4th Quarter 1985	320	
1st and 2nd Quarters 1986	510	*By YE1986 this figure should be
3rd and 4th Quarters 1986	115*	closer to the 1st half total as
Not specified	90	additional orders are received.

A proportionate division of the "not specified" orders suggests 370 deliveries in 1985 and 685 in 1986, plus another 350 or so orders picked up next year.

At the high end of the mainframe market, then, there is little evidence of a "MIPS glut." If the current industry downturn does reflect a pause to digest earlier gorging on computing power, the butterfly tummies belong to supermini and maybe PC users, not to the purchasers of big-ticket, high-performance processors. High-end demand is also reflected in the projected 170 orders (64 on the survey) already booked for the 3090-400, which won't be available before 2Q 1987 unless (until?) IBM jimmies the lock on its scheduled delivery date.

Considering the importance of mainframe revenue for its profit margins, IBM must be pleased with the response so far to Sierra. But the survey also pinpoints several short-term problems of which IBM financial strategists are undoubtedly -- and painfully -- aware.

Next year's Sierra sales will eventually staunch the wounds from this year's weak showing, but in the meantime users' reactions to the 3090 are a major cause of the current bloodletting. Purchase rates of 308X systems are down noticeably from the plans revealed in IDC's most recent IBM Migration Survey, completed at the end of 1984 before the Sierra announcement (see EDP/IR, Vol. 20, No. 20, 21). Even if users aren't anteing up the money for 3090s just yet, they are wary of investing in yesterday's 308X technology. IDC estimates purchases at non-Sierra 308X sites in 1985 as follows:

3084	2Q:	0	3Q:	23	4Q:	15	Total:	38	Undecided:	15
3081	2Q:	14	3Q:	23	4Q:	32	Total:	69	Undecided:	52
3083	2Q:	7	3Q:	10	4Q:	19	Total:	36	Undecided:	11

The "Undecided" category reflects users who expressed an interest in 308X purchases but did not offer specific plans; presumably many would be candidates to buy in 1985 if the price were right, which it may very well become. Also, new 308X buys at 3090 sites are not counted, nor is migration from 43XX and 303X machines represented. But the bottom line is that with the imminent advent of Sierra, the 308X line has lost much of its sex appeal, and many of its sales.

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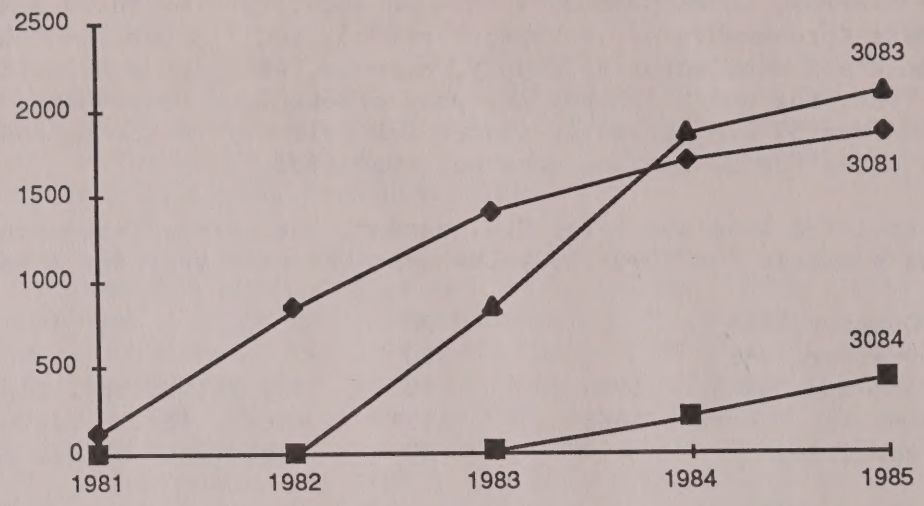
U.S. INSTALLED BASE (UNITS), IBM 308X FAMILY, 1981-85*
(Copyright 1985 -- International Data Corporation)



*1985 figures take into account results from IDC's Sierra Survey, May 1985. Also, note that total shipments cannot be deduced from net changes in the installed base due to the effect of field upgrades.

As 308X sales slip, the removal rate will soar as users reduce their inventory of 308X boxes to clear a space for Sierra. Projections from survey data indicate that 3084 sites will be cutting 50 3084s and 60 3081s to help make room for their 325 3090-200s. 3081 sites would slice off 270 3081s and 10 3083s to accommodate 580 200s. As a result, the 3084 installed base will double in 1985 rather than triple, as Migration Survey respondents expected, while the 3081 base begins to face serious erosion.

Everyone knows that IBM knows that everyone knows what IBM has to do in response, and it has already begun doing it: on June 18 it cut the purchase prices of above-base 308X models by about 6%. Further cuts will be needed as IBM swallows still lower returns on 308X sales to get them on the table at all.

At some point, probably about a year from now, IBM will have to pull the plug on the 308X life support system. By then user resistance to 308X boxes will likely affect migration from the 43XX and 303X families, and IBM will feel pressure to introduce a 3090-100 uniprocessor. Once that occurs, there will be almost no reason to buy a new 308X box. This day could be hastened by the influx of excess capacity 308X systems into the leasing market at bargain basement prices, which could begin to affect sales of the expensive Sierra. Although IBM would like to squeeze profits from the 3090-200 as the Sierra foothill as long as possible, the 200 will have to be cut in two at some point.

It will require some delicate balancing on IBM's part to make the most from both the declining 308X family and the ascending Sierra line, but of such balancing in the past has IBM's reputation as a brilliant financial tactician been forged. Under the circumstances, there is little reason to doubt that IBM can look forward to a splendiferous year -- in 1986. Even fourth-quarter Sierra sales, though, will not suffice to make 1985 a beauty. IBM won't suffer the disfigurements marring the appearance of many of its competitors, but right now it seems that few would call Big Blue comely come December.

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IBM SITE CLASS POPULATION OF U.S. 308X SYSTEMS, JUNE 1985 ESTIMATES
(Copyright 1985 -- International Data Corporation)

Site Class	Sample Sites	U.S. Actual Sites	Ratio
3084	135	280	2.07
3081	365	1,300	3.56
3083	293	1,675	5.72
Other*	67	na	na
Total	860	3,255**	3.78

*Includes PCMs, 43XX, and 3033 sites. **308X sites only

Sighting IBM Mainframe Sites

Preparation of the Sierra Survey also allowed IDC to paint a more detailed picture of the IBM mainframe landscape. A question that has often arisen is the distribution of 308X sites -- that is, of the senior system (by performance category) at different installations. The distribution of systems in the survey sample has been used to generate average distribution by site class:

- o At a 3084 site class, an average of 1.25 3084s, .63 3081s, and .10 3083s.
- o At a 3081 site class, an average of 1.27 3081s and .12 3083s.
- o At a 3083 site class, an average of 1.05 3083s.

This sample distribution was the basis for the table above, with the ratio used to obtain total U.S. estimates.

NEW IBM PRODUCT ROUNDUP

In sheer poundage of paper the sheaf of announcements from IBM on June 18 more than matched the cluster of announcements (including Sierra) last February 12, but in historical importance there's as much difference as between Lincoln's Birthday and Paul McCartney's. Still, some things were worth noting:

- ● Helping a System/36 Achilles' heel by doubling memory capacity, and adding an entry-level System/36 PC with IBM-made 40MB hard disks.
- ● New programs and a mid-range processor to help System/38 in offices.
- ● All-points-addressable color graphics terminals and ASCII terminals with wide non-IBM emulation.
- ● An AT version of the 3270 PC.
- ● Price cuts, not only on selected 308X products (see p. 4) but on other slow-moving items (4381s, System/38) as well.

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DOING IT SCULLEY'S WAY: JOBSLESS AT APPLE

Lotus' announcement that Jazz at last was out was about the only bright spot in a month that saw a lot of news about Apple, little of it good: closing a factory producing Macintosh XL parts plus prototypes of the Macintosh Office file server, now delayed, and a hard disk that a third party must now make; laying off more and more workers; letting out the word that quarterly financials will be bleak. As the bad news accumulated, John Sculley has tried to counter the impression of drift with a series of breathtaking initiatives.

First, it was announced that Apple will redirect a toned-down national accounts sales division towards educational markets and leave large corporate accounts to its dealers. Apple's failure here was its own inability to enunciate a clear strategy on what level of corporate America, and of individual corporations, is the best market for Macintosh. This is something dealers must now work out on their own, with little guidance from Cupertino.

Apple executives express the hope that dealer resentment of its corporate marketing moves will now diminish, a consummation devoutly to be wished by a company so dependent on the enthusiastic sales pitches of others. Still, dealers might note with the proper degree of wariness that Apple has not foresworn a marketing strategy that could render their new position a short-term reprieve at best: a repositioning of national accounts would also be a logical preparatory step if a new partner with more clout in America's boardrooms were to become involved with Apple in joint marketing efforts.

The second announcement was an organizational realignment into functional rather than product groups. By breaking up the autonomous Macintosh unit, the restructuring strips Steve Jobs of day-to-day supervisory duties over the manufacturing and marketing of the Mac. Jobs' new job title seems to be "champion of Apple's spirit," which sounds spiffier than a gold watch and handshake.

A third announcement limned the dimensions of the radical "consolidation" following from the realignment, and other cost-cutting steps to combat a "significant" slump in the PC industry. Another 1,200 employees were terminated, representing over a fifth of Apple's remaining work force (1,600 had already received their pink slips in recent weeks). Half of its factories were closed, with the heavily automated Macintosh facility in Fremont, California, assuming manufacturing responsibilities for the Apple IIc. Singapore will continue producing IIe machines, while Cork is the survivor of the two Irish sites servicing the European market. One-time costs will cause a quarterly loss.

What's left is still what Sculley calls "a debt-free company with over $200 million in cash reserves" -- and a company that from now on will bear the indelible imprint of its president and CEO. Last year was a scramble for attention and sales that couldn't continue indefinitely. At some point Apple was going to have to join the managerial mainstream; now, Sculley has decided, when cuts in any case were necessary due to the downturn, is the time to reposition Apple as a mature, fiscally responsible and logically organized corporation.

Jobs meanwhile is taking a vacation. If Sculley had the leverage to abolish the position of general manager of the Macintosh division, as chairman and chief stockholder of Apple Computer, Inc., Jobs could probably replace Sculley if he had a mind to. Presumably he won't any time soon, if only because of Sculley's Pepsi connection -- after all, Coke just blinked.

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• SPURIOUS SPURROUGHS. People knew that the Bunch could start losing letters any day, but few were prepared for the possibility of a merger between Burroughs and Sperry. Neither, in the final analysis, were they. On the plus side would have been leverage in negotiating for parts, and conceivably some help in expanding marketing efforts in the other's strongholds (banking for Burroughs, government contracts for Sperry). On the negative side (much more expansive to most observers), there seemed little synergy between the two incompatible lines. Burroughs was more technologically advanced, while Sperry had a larger installed base but was moving more in a systems house direction. The breakdown in negotiations, however, wasn't over these issues, or apparently even money. Rumor has it that Sperry execs worried about being swallowed in W. Michael Blumenthal's maw. Indeed, Blumenthal's aggressive personality does seem to have been a factor: he could have been dreaming of using what would have become the industry's number two firm to go one-on-one with John Akers.

• TANDON AND THE GREAT JAPANESE FLOPPY FLAP. American industries falling on hard times often used to turn to government regulation for quiet relief. In the current climate of deregulation, that remedy is out, with one exception: industries now turn to the U.S. government to regulate the Japanese.

Tandon has had its share of the microcomputer disk storage industry's recent troubles. Its most recent quarterly results indicated revenue down 42.2% from the previous year, and a quarterly loss of almost $20 million. The only good news that Sirjang Lal Tandon could muster was that he'd expected even worse news, what with falling prices and IBM cancellations. Its new hard disk drive lines are selling reasonably well, but other products, including floppy disk drives, have been treading water.

In 1984 the company became concerned about the flood of Japanese entries in the two high-growth floppy sectors, double-sided 3.5" and half-height 5.25". Its response was to initiate an action before the U.S. International Trade Commission last December charging that Japanese companies were infringing on the patent for double-sided floppies issued for Tandon's TM-100-2, which first shipped in November 1978. Tandon's lawyer could not comment on whether other U.S. or European firms were guilty of the same infringement, but he confirmed that the complaint encompassed any double-sided floppy of any form factor. The three companies singled out were the three Japanese leaders in double-sided 3.5" and 5.25": Sony, TEAC, and Mitsubishi. Seven other Japanese firms were mentioned in the complaint, although not charged: Alps, Fujitsu, Matsushita, NEC, Ricoh, Tokyo Electric, and Toshiba.

On May 31 Tandon announced that the preliminary finding by the ITC's administrative law judge was in its favor. This means that the full commission will meet soon, probably within the next month, for a bond review, which in comparable cases in the past has meant that the accused foreign exporters had to post bond equal to 100-300% of the sale price of the goods in question until a full commission trial made a final determination. The trial will take around a week in August, with the verdict following probably in November or December. But even if Tandon's leading Japanese competitors are given a clean slate, the bond could temporarily give U.S. firms, including Tandon, Hi-Tech Peripherals, Micropolis, Omek, and Haba (nee Shugart), some much needed breathing room to reestablish an American floppy role.

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• CRAY-2 OFFICIALIZED. It has become increasingly difficult to know when to send cards to the proud vendors of new computers, which are often around at major sites for months before the manufacturer gets around to registering the birth. The surest indication that the Cray-2 was considered a finished product came with the news that Seymour Cray renegotiated his contract last year to work fulltime on Cray-3, but the company waited until after the first full-configuration installation at the Lawrence Livermore National Laboratory was securely in place before "unveiling" it on June 3. The Cray-2 system offers a Foreground Processor riding herd on four Background Processors, but lately Seymour Cray has been less concerned with architectural innovation (Steve Chen's group at Cray is much more CAE-oriented) than with packaging and cooling. The Cray-2 takes up just 16 square feet of floor space and employs liquid immersion cooling, which steeps the components in a fluorocarbon coolant.

• HARRIS' TWEEDY NEW SUPERMINIS. Harris has announced two high-test superminis addressing what it considers two radically different segments of its traditional scientific/engineering market -- at least it hopes they're that different, since the operating systems will be incompatible. The Harris 1200 is rated at 5.0 MIPS in 32-bit precision and 4.1 in 64-bit precision, only marginally better than the Harris 1000, but added memory subsystems and high-speed ECL bus supposedly enhance performance up to 55% over the 1000. The 1200's high cache hit ratio and fast turnaround on misses are aimed at users seeking quick real-time response; two models are available with progressively faster cycle times. The 1200 is upwardly compatible with other H-series superminis. Not so, though, with the other entrant, the first member of a Harris family of Unix superminis co-authored with Computer Consoles for multi-user time-sharing environments (CAD/CAE, etc.). After such streamlining as simplifying the Unix-V instructions, HCX-7 supposedly soars to 7.1 MIPS, fastest yet on Unix.

• RISC-II AT RIDGE. A new generation of RISC-architecture computers from Ridge is aimed at both the VAR market for CAD/CAM/CAE and for end users in the engineering computing market.

• GORY DAYS. Wang anticipates the first quarterly losses since getting into OA and fires 5% of the "family" of employees. Discounting the possibility of an upturn in semiconductor demand in 1985, National Semi lays off 1,300 workers. Memorex closes shop for two weeks in July due to sluggish sales. Data General cuts 1,300 employees and intimates that the quarter ending this month will see an operating loss. H-P gives workers a Fourth of July vacation whether they want one or not. Honeywell forecasts a sharp quarterly decline in earnings and, for want of any better ideas on what to do with its money, says it will repurchase up to two million shares of its common stock.

• RISING SUN? Fujitsu Lmt. reported revenue of $5.01 billion for FY1984, which ended March 31. This represented an increase of 30.3% over the previous year, and comes in between Sperry's $5.69 billion and Burroughs' $4.96 billion for the same time period. Fujitsu's net sales from exports grew 42.4% in FY84 to $1.24 billion, compared to a rise in the value of exports of 16.2% for the previous year. However, the recent rise in exports seems to correspond almost entirely to the Japanese semiconductor surge. The percentage of Fujitsu's income derived from exports did not increase that dramatically: 22.1% in FY83, 24.2% in FY84. Three quarters of Fujitsu's revenue still comes from Japan.

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D.C.BELLOMY, ASSOC.ED. MAY 24, 1985 ● VOL. 21, NO. 2 P.J.MCGOVERN, PUBLISHER

IDC INTERNATIONAL DATA CORPORATION

VAXINATING A CHIP: THE MICROVAX II AND DEC'S WOMB-TO-TOMB STRATEGY

Kenneth H. Olsen has been bubbling over twice now in a little over six months. First on Halloween there was Venus, the long-awaited cap to the VAX line, and now the MicroVAX II, a 32-bit "VAX-on-a-chip," takes a bow. The new supermicro is, according to Olsen, "certainly the most exciting and, in many ways, the most significant product Digital has ever developed."

Indeed, there is potentially even more cause to celebrate the MicroVAX II than there was for the 8600. Venus has been enticing sales as the DEC customer base seeks higher performance, but her role is still primarily defensive against Digital's supermini competitors. The MicroVAX II, on the other hand, could help develop important new markets for DEC. As Olsen more expansively put it, the new product "represents, not the end of an investment stream, as some have suggested, but rather the beginning of a whole new wave of computing. We think this machine will truly change the way the world does computing."

Responsible for that change, if it occurs, will be the MicroVAX 78032 microprocessor, a ZMOS 32-bit chip with 125,000 transistor equivalents and on-chip memory management. Backing up the basic MicroVAX chip will be an optional floating-point coprocessor, the 90,000-transistor MicroVAX 78132, which is allegedly up to six times faster than "competitive" chip sets and two to three times the performance of Intel and Motorola floating point units.

From this will flow performance levels on average only 10% less than on a VAX 780. Scientific/engineering applications should run at 85-100% of 780 performance, while in commercial use performance will range from 60% to 90% of a 780, depending on the application and instruction mix. From the MicroVAX II chip will also flow immediate consequences for DEC and the industry:

- The creation of a new linchpin to the Digital Style of Computing, DEC's micro-to-mainframe marketing strategy.
- Tighter contests for supermicro and intelligent workstation vendors.
- Questions about the long-term viability of mid-range VAX systems.

MicroVAX II power will be available in various configurations to OEMs and end users, including a basic package for $18,840; 4-, 8-, and 16-connection

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multi-user systems; and two VAXStation II models. The basic MicroVAX II is available now, with the multi-user versions to follow in volume shipments beginning in July, roughly the same time as VAXStation II goes on sale.

Users will be offered a choice of operating systems and other software that are "functionally equivalent" to the regular mini/supermini versions. DEC is most concerned to get the word out about MicroVMS, a packaging of the VMS operating system for MicroVAX. With it all VAX high-level programming languages, development tools and utilities, and data management tools are accessible. For those interested Digital also offers ULTRIX-32m, the MicroVAX edition of Berkeley 4.2 Unix, and VAXELN for dedicated real-time systems that do not require a full operating system (e.g., in industrial automation and robotics).

Because all but two types of VAX instructions have been squeezed onto the 78032 chip (missing are character string and packed decimals), all VAX applications are said to be runnable either now or in the near future. By the end of the year this will include ALL-IN-1 for distributed office applications and A-to-Z for departmental business applications.

They will run, but the question now becomes what "functional equivalence" will in fact signify. The full answer will not emerge until a wider range of applications software is available (Digital is naturally taking its time to debug all transfers thoroughly). However, it does appear that DEC is committed to applications transparency all the way from MicroVAX II to Venus, and that differences in implementation would be of negligible concern to the end user.

It is probably critical for its larger goals that Digital succeed in achieving not only full VAX compatibility but complete transparency as well. The MicroVAX II is a stellar competitor all on its own, with clear superiority over the low-end entries of other supermini vendors and (if DEC's claims are sustained after independent testing) a significant edge over the price/performance of supermicro specialists like Altos and workstation wonders like Apollo. But DEC doesn't want to sell it just on its own: it's selling the new MicroVAX as the small business/departmental segment of the Digital Style of Computing.

And that is supposed to mean a single computing environment ranging from the desktop to the MIS department. If you want micro-to-mainframe, they say, you want to buy Digital, where you can get the same hardware architecture (VAX) and the same software system (VMS) throughout and can redeploy programs and applications anywhere in an organization.

DEC has given a couple of examples of how the MicroVAX II and VAXStation II can be used in this context. In scientific applications, for instance, either could support statistics and analysis packages developed on large VAX computers and access a supermini for more CPU-intensive applications. In commercial use the MicroVAX would be able to capitalize on DECNet and other communications possibilities accruing from VAX-VMS continuity. Videotex is just one example.

There is a weak link, though, in the Digital Style of Computing. With the 8600 and now MicroVAX II, DEC has achieved enviable price/performance levels at either end of its unitary environment. But the middle is beginning to develop a distinct middle-age sag. There remain valid reasons to buy a far less cost-efficient VAX 780 than the same performance on a chip (e.g., larger user capacity and VAXClustering), but the MicroVAX II only underscores DEC's need for new 2-3 MIPS, $100-400,000 computers in the VAX family.

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TERMINAL ILLNESSES: ASCII, ANSI, AND 3270 MARKETS FLATTENING

The numbers emerging from a recent IDC report on the 3270 market as well as a forthcoming survey of the ASCII and ANSI universes are impressive:

- 3.6 million ASCII terminals installed in the U.S. by December 31, 1984, with 726,000 worth $627 million added during the year.
- 2.9 million 3270 terminals, with 633,000 shipments worth $1.2 billion in 1984.
- 1.1 million ANSI terminals, with 391,000 new arrivals worth $577 million in the same timeframe.

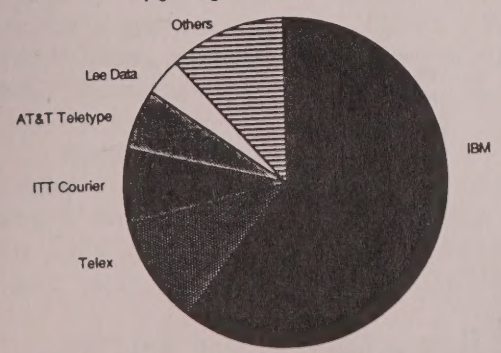
The shipment figures, moreover, generally reflected healthy annual growth rates. ANSI shipments were up 32.5% over 1983, 3270 terminals 19.2%, and ASCII 18%. The value of shipments also showed vats of black ink for the year, in two segments anyhow: ANSI shipments were worth 20% more than they had been a year earlier, and 3270 shipments brought vendors 9.5% more money in 1984.

Unfortunately, last year's exception will soon be the rule, according to IDC projections. The dollar value of ASCII shipments grew only 2.5% over 1984. And things won't be getting much better: ASCII value growth should continue to hover just above the 2% mark for the rest of the decade. By 1989, the other classes of terminal should be turning in comparable performances -- the value of 3270 terminal shipments that year should be up only 3.6% over 1988, and the value of ANSI terminals up a bare 1.4%.

What is happening is the maturation of the terminal market, which could all too soon lead to an oversaturation of terminal manufacturers. The growth rate in devices shipped is already beginning to taper down, generally from a little under 20% in 1984 to just over 10% in 1989. At the same time, prices will continue to plummet for ever more functional terminals. With these growth rates and price slopes, vendors will find it increasingly difficult to turn a profit.

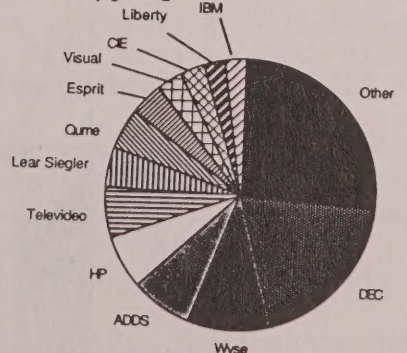
The new IDC reports indicate that the immediate future will vary for each of the three principal classes of terminal. What will remain constant will be turbulence, and the certainty that some will not survive it.

3270 TERMINAL MARKET SHARES,
U.S. SHIPMENTS, 1984
(Copyright 1985 -- IDC)



633,385 shipments

ASCII/ANSI TERMINAL MARKET SHARES,
U.S. SHIPMENTS, 1984
(Copyright 1985 -- IDC)



1,117,000 shipments

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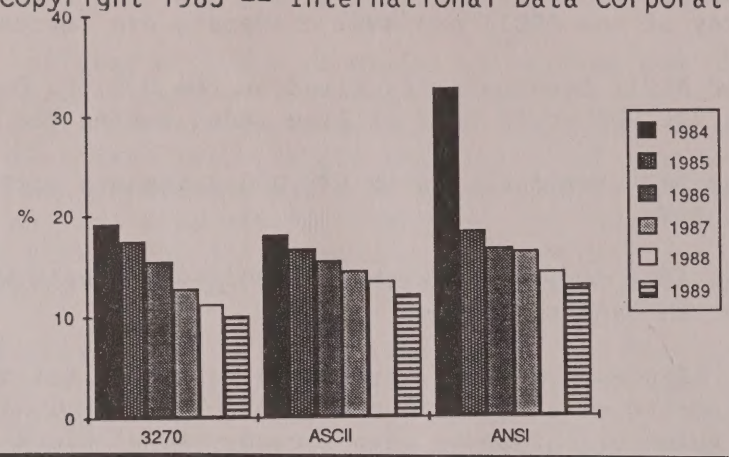
ANNUAL GROWTH RATES OVER PREVIOUS YEAR FOR ASCII, ANSI, AND 3270 TERMINALS, UNITS, 1983-1989
(Copyright 1985 -- International Data Corporation)

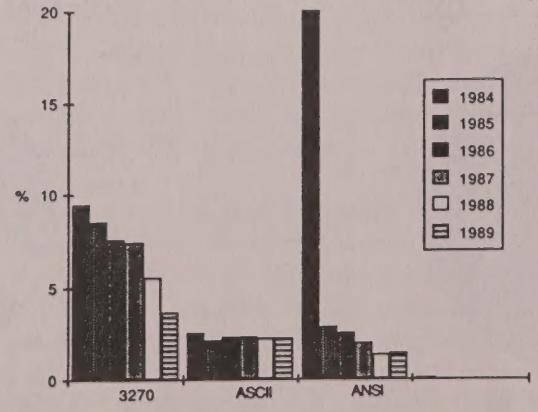


The 3270 display terminal is now only one segment of the 3270 universe. 3270 has become more than a product: it is a communications protocol that can be tapped by ASCII terminals through a converter and increasingly appears on PCs. Managers, secretaries, business professionals, and others who want 3270 communications will often choose to combine it with their desktop computers.

The effect of this transformation will not be cataclysmic on the terminal market. In 1984 3270 terminal shipments still accounted for 78.4% of the 3270 universe, followed by PCs supporting 3270 communications with 19.2% of total shipments, and ASCII terminals with protocol converters at 2.4%. Even five years from now, 3270 terminals should still comprise about 68% of shipments. The pricing gap between terminals and PCs should direct the cost-conscious to the 3270 for the next few years at least, and beyond that in certain applications. But the PC impact will be a major factor in the sliding growth rates.

Just as crucial for the future of most players in the 3270 market is the determination of IBM to color it an even more electric shade of blue. For a decade and a half IBM shrugged off the sales won by PCM rivals with lower prices, faster delivery, and more features. Last year that changed, utterly. In March 1984, IBM introduced a new family of aggressively priced, rapidly

ANNUAL GROWTH RATES OVER PREVIOUS YEAR FOR ASCII, ANSI, AND 3270 TERMINALS, DOLLAR VALUE, 1984-1989
(Copyright 1985 -- International Data Corporation)



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available 3270 terminals. IDC also expects IBM to begin taking the initiative more often in introducing flashy features.

Some fallout has already begun. Raytheon Data Systems is gone, Beehive has had loan problems, and Lee Data attempted an abortive merger with Visual Tech and has given pink slips to over 100 employees. Other companies have been more successful, notably Telex. But everyone in the field knows that they now must contend with two forces of nature: slower growth, and the "New IBM."

It is not yet clear how closely the ANSI market will replicate 3270 experience. The long shadow here is cast by DEC. After the introduction of its hot VT200 family in November 1983, Digital's terminal shipments leapt about 28% in 1984 and accounted for 19.3% of domestic ASCII/ANSI sales. Its market control allowed it to raise the price of a VT220 from $1,295 to $1,395 in July 1984.

Then this month the cost of a VT220 suddenly dipped to $1,095. Plug-compatible vendors were slow to respond with upgrades from their VT100 lookalikes, and one that did respond, C.I.E., was slapped with a lawsuit claiming VT220 patent infringements. But the market is too tempting to keep PCM competitors locked out indefinitely. Suddenly there are at least 13 domestic terminal manufacturers in the new ANSI market, with more to come, plus foreign vendors. Many of their products are selling in the $800 range, hence DEC's change in pricing strategy. The battle for the decelerating ANSI market has just begun.

In the non-ANSI ASCII marketplace, the falling prices/falling profits convergence so typical of so much of the computer industry (see EDP/IR, Vol. 20, No. 24), has become particularly debilitating. Technology has eroded the distinctions IDC employed in the past between low-end conversational, character-mode, and high-end full-editing, block-mode terminals. There is now one ASCII market, with variations in price and features but a continuing migration of full-editing features to low-cost terminals. Qume has carried this migration farthest with its QVT 101, a block-mode terminal costing a mere $395. The race is now on for the lowest cost terminals with the most advanced functions.

Only economies of scale from mass production can justify some of today's prices. Only sizable market shares can allow mass production. And only a few vendors can achieve significant market shares.

None of the approximately 50 ASCII entrants currently has the market clout to certify it as a certain survivor. ADDS' 11% of 1984 ASCII shipments represents the largest market share of any vendor. However, today's lack of market masters will not last for long. ADDS is exceptional in that it is a relatively elderly competitor (its Envoy first presented its credentials in 1969) that is still a potent force. Other long-time leaders are showing wear-and-tear. Televideo, which used to be king of the hill, fell to fifth place in the ASCII/ANSI competition last year. This month it reduced its workforce by 15%.

Moving up are young vendors that understand what's going on in the terminal market. The most impressive gains have been registered by four-year-old Wyse, which was second only to DEC in the total number of ASCII/ANSI terminals sold in 1984 and hard on the heels of ADDS with 10% of all ASCII terminals shipped last year. Qume, too, has indicated that it will be a force to reckon with.

Falling prices and PC competition are setting harsh parameters for future terminal sales. The fastest to adapt to change will be the aptest to survive.

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EXECUTIVES ENDORSE TRENDS, CHARY OF PARTICULAR PRODUCTS

Nestled in Napa Valley's Silverado Country Club from April 28 through May 1 were 288 data-soaked attendees at IDC's Spring Executive Conference. They had come to learn about information industry trends from speakers representing a wide variety of organizations and perspectives. But the dispersal of data was not all in one direction: 76.4% responded to a survey designed to elicit their opinion of trends and products and to gauge the intensity of their reactions.

The results are a valuable non-random poll, valuable precisely because the polling was non-random: the sample was self-selected from among the most knowledgeable executives engaged in daily decisions affecting the industry. Most of the respondents were large users, the most sizable proportion of them major commercial users (38.2%). Another 26.9% came from various levels of government. Just over a third (34.9%) were vendors.

A persistent note throughout the survey responses is interest in new product trends, like multi-user departmental systems, but neutrality or positive dislike of particular products supposedly representing those trends. Respondents were asked to rank on a scale of 1 to 5 twelve products and/or trends, based on planning studies or implementation. EDP/IR has coded the responses to indicate strength of feeling, with a 3 scoring as 0, a 2 or 4 as + or -1, and a 1 or 5 receiving a + or -2. General questions received high ratings:

Word processing on microcomputers	237
4th-generation languages for applications development	185
Multi-user departmental systems	182
Micro-mainframe links	146

The responses were far different when the query dealt with brand names, even so widely known a product as System/36 or Unix. Here the numbers tended to cluster around the zero neutrality point because of more "no responses" (up to 30%), a much higher percentage of 3s in the returns, and a balance between favorable and unfavorable reports that could tip in either direction:

DISOSS (IBM)	31
Potential of Unix as a bridge between PCs, departmental processors, and data centers	12
System/36 (IBM)	-2
Unix on PCs	-7
GEM (Digital Research)	-21
VS-65 (Wang)	-26
Macintosh Office	-44
Topview (IBM)	-44

Often the responses would have been even more negative but for the government users, who seem more open-minded or less informed (take your pick, or both) than their peers in large corporations or the vendors who service them. For Wang's VS-65, only 16% of the vendors responding gave it one of the two favorable ratings, with 28% of the commercial users agreeing. But about 40% of the government users liked what they saw.

The same pattern holds for reactions to Unix as a bridge, with one major exception: commercial users are the hard sell this time. Just 20% gave it good grades, compared to 40% of the vendors and 43% of the government users.

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IBM's preponderant position in commercial MIS departments comes through in the reactions to Topview, which most users know only through the media. The word is not good -- only 10% of commercial users had a semi-favorable attitude, and none checked the 5 for really favorable. But there is a reservoir of good will towards IBM among commercial users that makes many more of them willing to assume a wait-and-see attitude. An extraordinarily high 51% of this group checked the neutral 3, 10% more than among government users and 12% more than among vendors for this question. Moreover, most of the 17% of respondents who chose not to say anything about Topview were users. So Topview's position at the bottom of the list can be changed if IBM works on a positive image among the majority of commercial users waiting to be convinced.

The negative rating on GEM, about which users know even less, is even more tentative. Its 59% of neutral responses was the highest ratio of any question, representing 60% of commercial users, 70% of government users, and 50% of vendors. The 30% no-response rate on the GEM question was likewise the highest.

Apple executives can take no such comfort from the reactions to the Macintosh Office. Dissatisfaction was fairly evenly spread among the three categories of respondent, while the neutral corner was much smaller. But at least about a quarter of commercial users, government users, and vendors alike give the Macintosh Office good grades, with a decent sprinkling of 5s in each group.

The next series of questions on the survey dealt with communications. SNA was installed at 74% of respondents' sites (90% of the commercial users, 54% of government users); DECNET DNA appeared at 8%, while other network types were adopted at 18%. When asked whether their organization planned to install a private network bypassing local telephone company facilities, 35% said yes, 37% said no, and 27% weren't sure. LANs had been implemented at 56% of respondents' sites, with 3Com (20%) and Ethernet (16%) the most cited choices.

Attendees were also asked to volunteer their opinion on the most significant outcome of the AT&T divestiture. Surprisingly for such an open-ended question, the same answers kept turning up:

Confusion	23%
Poor service	18%
Higher Costs	16%
More alternatives	14%
Competition for IBM	11%

In what may be wishful thinking, most of the "competition for IBM" responses came from vendors.

Respondents were next asked to rate on a 1-to-5 scale various systems components on their present (not past or potential) ability to solve office and departmental computing requirements. After the same weighting as before to measure intensity of feeling, the scorecard reads:

Microcomputers	109
Minicomputers with integrated packaged software	65
Single-user micro software	57
Dedicated word processing	34
Micro-mainframe communications	-2
Multi-user micro software	-30

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• LOTUS LOOKS TO MAINTAIN LEADERSHIP. Presumably it was not simply serendipitous that Lotus' annual meeting on May 20 was held in Boston's Symphony Hall. Jim Manzi and Mitchell Kapor focused their remarks on two areas targeted for future growth: software development agreements for new products, both with employees and third parties (not excluding acquisitions like Dataspeed); and international sales, which they hope to boost from 10% of 1984 revenue. One new announcement encompasses both areas -- a strategic alliance with Kanri Kogaku Kenkyusho Ltd. to translate Lotus programs into Kanji and develop new products for the Japanese market. Lotus Japan will also open as a wholly owned subsidiary. Last year Lotus opened offices in Paris, Munich, and Windsor, England, while 1-2-3 spread its sheets in 58 countries.

• AT&T LEAVES MESSAGES. AT&T executives have so far been spending the month of May trying out as futurists. At the Nippon Telephone & Telegraph Company's International Symposium in Tokyo, Ian M. Ross, president of Bell Labs, forecast the fulfillment of the promise of the Information Age through "major integrated roles for an intelligent public network, for private networks, and for intelligent customer premises equipment." AT&T would do its part, Ross vowed, to achieve open, standard interfaces; integrated service and network management; distributed intelligence; consistent user interfaces; and universal connectivity. Special emphasis was placed on integrated services digital networks (ISDNs) as the necessary next step to link private and public networks with standard access interfaces.

Ross's theme was amplified at the United States Telephone Association meeting in Las Vegas by John Mayo, Bell Labs executive vice president for network systems, and by Wayne Weeks and Paul M. Villiere, respectively president and marketing veep for AT&T Network Systems. According to Weeks, "The leaders of the telecommunication industry know we need to have a vision -- a goal." Offered as a vision were AT&T's own plans: establishment of ISDNs by 1987, followed by the introduction of Universal Information Services in the 1990s. A decade from now, if the best laid schemes of mice and Ma Bell do not gang a-gley, "people everywhere can have access to any kind of voice, data or image service, in any combination, in any place, at any time, with maximum convenience and economy." This would occur through integrated access and transport, larger bandwidths, and customer customization of virtual subnetworks.

Less Olympian, if not necessarily more mundane, goals were on the agenda when James E. Olson was elected president and COO of AT&T effective June 1. A chief operating officer is needed, according to Charles L. Brown (who remains as chairman), "to drive research, applications development, investment decisions and service capabilities straight at customer requirements," as well as to solidify organizational cohesiveness and more clearly define accountability. An unstated goal would be to affirm management continuity into the mid-1990s.

• HITACHI CHIP BLENDS HIGH SPEED, LOW POWER. Following up on its new 64K SRAM chip, Hitachi America will begin making available other products created with its Hi-BiCMOS process. Integrating high bipolar speed and low CMOS power in the same circuit, Hi-BiCMOS has potential from the bottom to the top of the industry, from putting more punch in portable computers to cooling off mainframes and supercomputers. Although Hitachi chose to start simple with static RAM, it promises to apply the process to gate arrays, custom circuits, etc.

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EDP industry report

● THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"The Gray Sheet"

D.C.BELLOMY, ASSOC.ED. MAY 14, 1985 ● VOL. 21, NO. 1 P.J. MCGOVERN, PUBLISHER

IDC INTERNATIONAL DATA CORPORATION

DANCING IN THE DARK: PLOTTING THE OPTICAL DISK REVOLUTION

1985, vendors boast to the background beat of analysts' nods, will be the year when optical storage becomes a significant force in the market. It does appear that optical disks will soon begin filtering through systems integrators into back-up roles for small- through medium-scale computers, and maybe large- as well. But if there is to be an optical revolution, there are still more questions than answers as to its nature and significance.

Forward movement in the optical arena is palpable and visibly accelerating:

- Four 12" disk manufacturers (Alcatel Thomson Gigadisc, Optimem, Hitachi, and OSI) are actually shipping in the U.S. market, although not yet in volume.

- Two 5.25" vendors -- Information Storage Inc. (ISI) and Optotech -- have begun to beta test models in recent weeks.

Another company also has a significant optical entry in beta test, although it would be more difficult to portray its status as palpable movement: Storage Tech has been testing its 14" 7640 for nigh onto two years now.

STC's once unwonted hesitancy is partly due to its current financial turmoil (see story inside), and possibly to pesky bugs in the disk (although the beta site graders have allegedly been giving the 7640 good marks). But there are also ample grounds for second thoughts for anyone trying to figure out what to do with optical disks once there are droves of drives on the market:

- Lack of standardization in media and interfaces.

- Decisions by both computer manufacturers and users to wait on optical until erasable disks are perfected.

- Broader user uncertainty on the optical alternative.

The lack of standard media is a short-term problem for drive manufacturers. With no standardization on substrate type, form factor, formatting, etc., they must typically depend on a single supplier's ability to fulfill demand. Just as crucial for the future will be customer choice on media for pricing, etc.

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The expectation is that as the optical revolution picks up steam, the media problem will take care of itself. For now Optimem and Alcatel Thomson are sharing the latter's media and plan to order from a true second-source shortly. Optotech is taking another tack: the 5.25" optical disk manufacturer has increased the sensitivity of the drive's circuits so that any media can be employed through a simple adjustment by the user. There are, however, trade-offs, particularly in formatting: it currently takes up to twelve minutes to format an Optotech disk. The company notes, though, that once a format becomes standard, it can be stamped on the media and waiting time can be reduced to zilch. In the meantime, Optotech will not have committed itself to any particular format, and so cannot be stranded after a standard is determined.

Standardization also continues as a major interface problem. The shift from magnetic interfaces requires decisions at both the host and drive levels, with the host interface being the really crucial choice. A consensus does seem to be developing around SCSI for 5.25" and the lower end (1GB) of the mid-scale 12" drive vendors, but everything is still de facto rather than de jure. At the drive level, recent informal gatherings have been focussing on ESDI for small non-erasable optical disks.

Presumably, once standard interfaces are established for non-erasable drives, they will then be transferred intact to erasable. This may turn out to be the only easy part of the transition, if and/or when it occurs.

AN ERASABLE ERUPTION?

Erasable disks may be reasonably close to fruition, now that 3M is producing media that can be employed by drive manufacturers. However, there is still no agreement on the best approach to erasability. 3M is using the most fully developed technology, magneto-optics, which focuses light beams to heat sputtered rare earth alloys. Coercivity is reduced until a magnetic field can reverse the state of an area of highly coercive material. It sounds complicated, yet the technology has been around long enough that it may appeal to users who have gotten used to magnetic disks. It is also open to the charge that it represents only "an interim step" on the path to high-density bit-level erasability, and still faces degradation problems when fields are switched rapidly.

Japanese companies like Hitachi are excited by what they view as higher-tech alternatives, notably phase-change. Hitachi has high hopes for certain copper-aluminum-nickel and silver-zinc alloys that change colors (i.e., crystalline structures) when heated and reverse the state at lower temperatures. An optical disk could use a semiconductor laser for different levels of heating, write and read data as varying levels of reflectance, and erase the results, seemingly at will. But in fact no one knows how long the process of reversing crystalline structures could continue without serious degradation. Long testing will be needed before optical disks could rely on phase-change, and before we know whether it offers an improvement over magneto-optic media.

There is still a third entry in the optical media sweepstakes, dye polymer, which seems even further behind in the race (if only because no one has yet bet heavily on it). Nor is it clear that it would dramatically improve on magneto-optic either. The proper technology for erasable media may not exist yet, and when it does potential customers will begin to realize that they've really been waiting on something more elusive: a clear sense of what optical is good for.

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OPTICAL DISK MANUFACTURERS IN THE U.S. MARKET
(Copyright 1985 -- International Data Corporation)

Vendor	Model	Cap/Side	Size	Avg Access	Tr. Rate	Drive $	Media $	Status
ISI	525WC	120MB	5.25"	200 msec	2.5 Mbps	$1000*	$100	Beta site
Optotech	5984	200MB	5.25"	300 msec**	2.2 Mbps	$1-2000	N/A	Beta site
Alcatel Thomson	Gigadisc GD1001	1GB	12"	100 msec	4.1 Mbps	$6-9000	$400***	Shipping
Optimem	1000	1GB	12"	100 msec	5.0 Mbps	$6000-7000****	$400***	Shipping
Hitachi	OD301	1.3GB	12"	250 msec	4.4 Mbps	$7100	$200	Shipping
OSI	Laserdrive 1200	1.9GB	12"	200 msec	2.0 Mbps	$6-8000	$2-300	Shipping
Toshiba	DF-0450	1GB	12"	500 msec	2.5 Mbps	*****	$367	Beta site
STC	7640	4GB	14"	62 msec	24 Mbps	$130,000	$140-225	Beta site

*Quantities of 5000 **Worst Case ***Quantity of 1 ****OEM quantity
*****Only beta ship price available ($15,000)

The problem for vendors targeting the 5.25" PC market, write-once or erasable, is that individual buyers tend to be more conservative about new technologies than MIS departments. It would be different, of course, if IBM were to incorporate optical disk drives, but IBM has generally been as chary of innovation at the low-end high-volume side as the buyers of two million PCs. There is widespread speculation about IBM's plans for optical storage, but in all likelihood Big Blue is also playing a waiting game.

There are some things worth waiting for. Probably the biggest boon from optical technology for PC users is an end to head crashes, since the use of lasers allows the stylus to be as far as 1,000 microns from the medium. There are also advantages to optical write-once disks for file storage, especially since optical media can be removed. The real market, though, will be for erasable disks, which should account for 75% of the optical PC market by 1990.

But how large of a market? There are at least two constraints on the future role of optical disks for PCs. One is price, especially after thin-film drives begin to offer comparable capacities at lower cost. The other is access time, which is currently far slower than consumers have become accustomed to. Optical pokiness would have a particularly negative impact on networking.

Mid-scale 12" optical drives are already shipping, mostly to so-called "jukebox systems" keeping massive records on a number of disks. If the drives are ever to ship in volume, however, special interfaces with DEC, DG, Wang, and similar mini and supermini vendors will be necessary. And then, once optical disks can be integrated into existing systems, once again users will have to decide why they should be.

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Erasable disks can probably also assume a significant position in the 12" world, as elsewhere, once the access time problem is solved. In the near term, mid-scale optical disks will be called on mostly to replace tape as back-up, with a secondary role as emergency pinch hitters for Winchester disks. In particular, optical's capacious storage capabilities will meet certain write-once requirements better than the competition. This means that a better opportunity exists than in PC storage for optical vendors to establish themselves before erasable disks are available, if they can exploit the proper niches.

It will take work, though, more work than many in the field yet recognize (at least publicly). IDC's most recent survey of IBM users discloses general contentment with existing storage environments. When asked their expectations for optical disks, 92.2% of 4361-class users had none at all, a neutrality shared by 82.2% of 4681-class users. An infinitesimal few thought that optical would replace DASD to any degree, while only 3% of 4381 respondents and less than 1% of the 4361 group offered any thoughts on optical as a tape replacement. Despite the claim of optical advocates that major users will lust after a new technology that will not require them to rewrite data every three years as tape libraries do, in point of fact many don't rewrite but just allow their tapes to collect dust. There will be very few easy sales out there.

On the other hand, the survey data offer real grounds for hope in one crucial area: 6.2% and 13.2% respectively of 4361 and 4381 users anticipate using optical storage for new applications. These numbers represented the niches that vendors must exploit to establish the optical market: notably, utilities and oil, banking, insurance, and government.

The same holds true for the large-scale optical market, with special rewards and caveats. On the plus side, profits tend to soar up in 3380 land. Also, even higher percentages of IBM large-scale users anticipate using optical storage in new applications (e.g., 25.0% of 3083 users). On the minus side, STC, the only player so far, does not inspire widespread confidence. Nor would anyone else necessarily fare much better, since the competition would be an IBM capable of reacting vigorously to protect its stake in mainframe storage.

A forthcoming report from IDC weighs all of these factors and offers an overview of optical opportunities, reflected in the chart below. But much will depend on how well vendors educate users, which in turn will hinge on how soon they succeed in clarifying the technology and market in their own minds.

U.S. OPTICAL STORAGE MARKET (INCLUDING PREPRODUCTION MODELS), 1985-90
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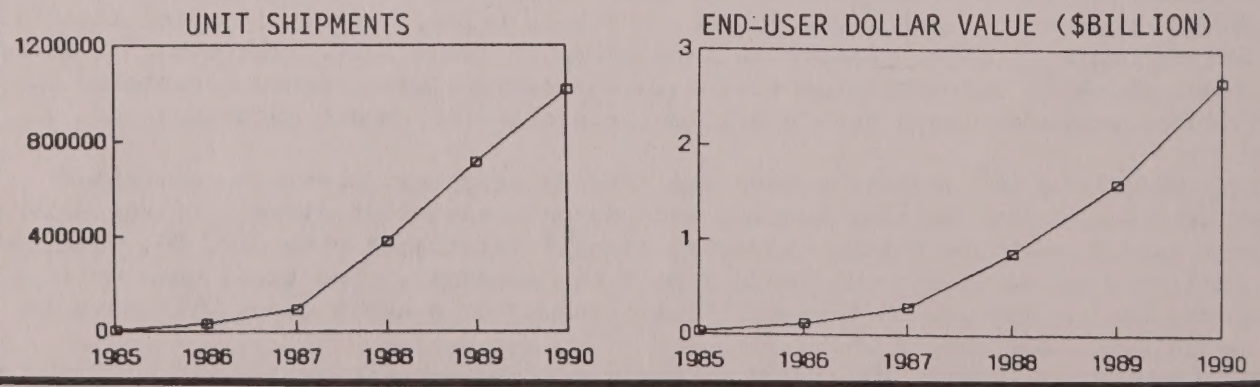

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DIGITAL PLAYS CD MUSIC

Besides the classic storage functions of tape, floppies, and Winchesters, optical offers another variety: Read-Only Memory (ROM), pressed by a media manufacturer (e.g., 3M) onto a master and then replicated like a record. The latest technology here is also the compact disk. Cost-effective uses are restricted, but often significant (e.g., maintenance manuals, reference libraries, financial data, design drawings).

The first integrated CDROM system has now been announced by Digital, which will combine a CD Reader (Model RRD50) with a Microvax or VAXStation through a Q-bus interface. 600MB of data (the equivalent of 1,600 floppy disks) will be available on a 4.7" disk at an average access time of 1.5 seconds. The catch remains ROM: once material is encoded, that's it. Consequently it is practicable only for data that need not be updated more than once a month. Also, to amortize the cost of mastering, at least 100 copies would have to be made.

DEC is not the only vendor determined to make whatever can be made out of CDROM. IBM is using it in the JX personal computer sold in Japan, and will reportedly offer it on the PC II when it comes out.

MEMOREX AND STC: PERIPHERAL POLITICS IN CENTRAL PARK

On successive Tuesdays in April Tavern-on-the-Green in Central Park partook of frustrated hopes and desperate hype, as two companies whose glory days are now gone with the snows of yesteryear attempted to persuade the press, consultants, and themselves that they were once more on the move.

First off the starting block was Memorex, which booked the restaurant to plug five new product lines. Pride of place went to a High Density Package of its 3680 disk storage system aimed at space-conscious IBM-compatible shops. The HDP is supposedly equivalent to a full string of single-density 3380s but takes up less than half the space. Also introduced were a new display terminal, tape cache processor, and communications and compact tape controllers.

Nonetheless, there was little pretense that the Memorex Five were alone worth renting Tavern-on-the-Green for. The real message the company was trying to communicate was that there is indeed a New Memorex. In 1984, the Burroughs subsidiary changed both its focus and its management team, and it was really to celebrate both that the news conference was called.

Memorex is now positioned only in the PCM peripherals market. It claims to have been profitable since Burroughs bought it in 1981, but admits that there have been numerous drags on its bottom line. In 4th Q 1984 media manufacturing was transferred to Burroughs, and earlier this year Memorex dropped its small 5.25" and 8.5" OEM business. The company brought in a little under $1 billion in 1984, wants to break the $1 billion barrier in 1985 even without media, and looks to achieve $2 billion in sales sometime soon, but wisely foreswore making any precise commitments except to say it wants to be the PCM peripherals vendor of choice. To achieve that distinction Memorex is now willing to OEM others' products; half the products introduced were OEMed.

Since the bona fides of such claims could not come from the products themselves, Memorex offered other evidence: its new management team. Memorex's

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president and (since last December) CEO is Philip S. Dauber, designated by Burroughs last year as the schoolmaster to teach its subsidiary new tricks without sparing the rod unduly. More gentle executive persuasion is apparently coming from a group of recently arrived refugees from STC.

Memorex's emphasis was reversed the following week when STC booked the restaurant for April 23. This time the product announcement could take center stage, but talk of a new Storage Tech had to remain vague in light of the company's continuing financial difficulties.

The product is a copycat marvel: a double-density 3380 clone that more nearly replicates the new IBM product than the Hitachi/NAS version, yet also offers a special premium: field-upgradability from the regular single-density model. The new 5.04GB 8380 Model E can be upgraded from the regular 2.52GB 8380 by removing the head disk assembly and some fiddling with the electronics. Double-density is achieved by increasing the track density by about 1.7 times and by using more space on the disk (a wider "stroke").

The 8380 Model E will cost $108,000 when it is finally available -- which will not be until 4th Quarter 1986. One year before that Storage Tech will make available a 72MB cache feature necessary to maintain performance levels at the increased capacity.

STC probably had no choice but to announce so far in advance, not just to assure users that they need not buy the special new IBM single-density disks if they are contemplating going double-density, but also to let the world know that the company still has some technological know-how. However, the fact remains that a year and a half is a long time to expect customers to wait, especially for a product from a potential lame duck. Meanwhile everyone has to wonder how well STC could absorb anticipated IBM price cuts.

The task of defusing such criticism falls on Storage Tech's new management team, which staged a video teleconference to tell a skeptical world that a great story can indeed begin with Chapter 11. Ryal Poppa, the new CEO, emphasized that a positive cash position of $83 million from product sales (at least until the company is no longer protected from its creditors) and new product announcements like the 8380-E and others still to come, indicated that STC was re-embarked on a "normal course of business." This should soon mean enhancements to its reel-to-reel tape and a new solid-state storage device. It will not mean an optical storage announcement any time in the immediate future, although the company still has 40 people working in the field and is hoping that Dupont can produce more receptive media than STC's home brew.

Poppa is one of the most persuasive CEOs around, and if he could do it all by himself maybe more observers would give STC a fighting chance. Alas, the loss of so many of its better executives to Memorex and others still shows. Probably Poppa's biggest task is to turn his persuasive skills on new hires.

THE DOUBLE-DENSITY TRIPLETS

	Capacity	Actuators/HDA	HDAs/Unit	Ht.	Width	$
IBM 3380 AE4/BE4	5.04GB	2	2	70.5"	42.25"	$134,740
NAS 7380 AE/BE	5.04GB	1	4	71"	50"	$128,000
STK 8380E	5.04GB	2	2	62"	36"	B:$108,000

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TAMING MEGAFLOP MONSTERS IN JAPAN: FUJITSU'S NEW SUPERCOMPUTERS

Professor Kenneth G. Wilson, Cornell's supercomputer superstar, brought his message to the IEEE National Media Briefing on May 1. On his trips to major American companies, Wilson stressed twice in his talk, he saw many people doing work on superminis that they should have been doing on supercomputers.

Wilson's emphasis goes to the heart of Cornell's approach to supercomputer research. The other three supercomputer centers established under the auspices of the National Science Foundation use Cray and CDC processors with the scientific/engineering bias that, as much as performance levels, has formed the public perception of what supercomputing is about. Cornell, however, is exploring parallel processing based on a commercial IBM 3084. Also, the other centers have spent much time discussing links with other major universities. Wilson, on the other hand, has been proselytizing among America's major corporations.

These differences reflect no debate about the future of supercomputing, but they do underscore varying emphases with potentially significant consequences for the American economy. In point of fact, some people in the field are playing more attention to possible commercial applications of supercomputers than others. Kenneth Wilson is one. So are many computer executives in Japan.

Case in point: Fujitsu's growing VP supercomputer family, with two new members. The VP-400 is the brawniest entry to date, rated at 1.14 gigaflops, or over twice the performance claimed for Fujitsu's previous high-end supercomputer, the VP-200. Designed to meet the demand for higher performance in such fields as nuclear power, aerostatics, and meteorology, the VP-400 is distinctly in the Cray-CDC tradition. The VP-50, Fujitsu's other new entry, brackets the series at the low end with a maximum speed of 140 megaflops. With only 12% of the VP-400's power, it offers a very different perspective on supercomputing.

The VP-50 is essentially a general purpose computer plus. It runs on OS IV F4/MSP, Fujitsu's large-scale computer operating system, with a vector processor control facility for additional number-crunching. In business use, it is rated at the same 15.4 MIPS as Fujitsu's M-380. For scientific/engineering applications, however, there is a gain in performance by a factor of about 16.

This places the VP-50 betwixt Sierra-class processors and supercomputers. Sources in Japan expect Fujitsu to unleash the Sierra-class "Hawk," a uniprocessor flying between 45 and 60 MIPS and a two-processor version between 80 and 100 MIPS, sometime in the 3rd or 4th quarter. When it appears, Fujitsu will have two different high-performance strategies: the "Hawk" for predominantly commercial activities, and the VP-50 for business use plus intense numerical computations. If more megaflops are needed, the VP-50 can be field-upgraded all the way to a 200 (one can't move up to a 400 due to additional pipelining). Fujitsu expects to sell 70 or 80 VP-50s over the next five years to industries with major R&D needs that would find current supercomputer costs too burdensome. Allegedly inquiries have already been initiated from firms in sectors such as construction, electricity, and heavy industry.

Fujitsu's announcement doesn't yet make Japan Inc. a significant force in megaflops. Between them Fujitsu, Hitachi, and NEC have installed just eight supercomputers in Japan. But it does show that Japanese strategists are already planning how to integrate supercomputers into national economic growth. In the long run, this may be as important as creating a fifth generation.

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• SEMICONDUCTOR ASSOC. PREDICTS BETTER DAYS -- SOMEDAY. The Semiconductor Industry Association released forecasts from its World Semiconductor Trade Statistics program to substantiate SIA president Thomas D. Hinkelman's expectation "that the problems inherent to the current downturn will have corrected themselves by the end of the third quarter of 1985, and that we will see a return to healthy growth during 1986 and 1987." After 46% growth in 1984, worldwide solid state sales are expected to slide 4% in 1985 to $24.8 billion. Growth rates for 1986 and 1987 are projected at 14% and 19% respectively. The United States market will be hardest hit in 1985, with a decrease in sales of 14% to $10 billion as against modest growth in Europe and Japan. The WSTS forecasts that integrated circuits will be especially off their feed, with the partial exception of digital CMOS and digital MOS memory. Discrete devices will lose less headway, although they had less to lose in the first place, and will recover at lower rates in 1986 and 1987. This will have to pass for health.

• BIG BLUE BUNDLES UP, OTHERS FEEL BIG CHILL. The real story isn't IBM's announcement that it would bundle free business software in dealer shipments of the PC-XT. The story is the flurry caused by the announcement and what it reveals about current jitters in the information industry. IBM is presumably clearing XT inventory prior to the PC-II announcement in the most painless way possible: no price cut, plus an opportunity to get some of its word processing and spreadsheet software and Topview established. But word of the IBM giveaway offered a listless Spring Comdex something on which to focus its collective discontent. In particular, nerves were exposed in two segments of the industry. Major software vendors, already chary of shakeouts, don't like competing with IBM freebies, even if only the XT is being bundled, the promotion will reportedly end in 90 days, and everyone else bundles anyway. And retailers, reeling from the pc implosion and overcompetition, now face an unpleasant choice: either they don't pass the savings along to consumers and risk losing business to the store next-door, or they do and cut their profit margin on independent software. Yes, things are that bad for retailers: after years of subsisting on hardware margins, they now increasingly depend on software sales.

• APPLE FINISHES PARING THE MACINTOSH XL. Weep for Lisa. First she lost her name. And now her very existence.

• DENELCOR SWEEPS EXECS, SEEKS CASH. David R. Miller, founder and chairman of the board at financially strapped Denelcor, "accepted the resignation" of the CEO and CFO and then resumed the CEO title himself. Miller cited "the importance of a viable parallel architecture to the national security" as the basis for his expectation that the company's cash flow will be unblocked.

• DISK DIVE. Xebec CEO James S. Toreson's analysis is probably valid: "Only after the elimination and consolidation of the current over-abundance of participants, will our industry prosper." The only problem is finding disk drive players strong enough to avoid elimination and consolidation. Even where revenues are up, profits are almost invariably way down. Xebec's net sales for the quarter were up 18.7% over the same period in 1984 -- and net income was down 92.5% to $164,000. Priam's revenue was up 25.0%, while a loss of $4,765,000 meant an earnings drop of 426.5%. Priam has now lost $13.8 million over nine months, of which only $5.6 million can be charged to expenses from the Vertex acquisition. Even elimination and consolidation may not help.

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